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MEDICINE & HISTORY

Series V Volume VII No 1 March 1985

TRANSACTIONS & STUDIES

of

THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA

MEDICINE & HISTORY

Series V Volume VII No 1 March 1985

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OF THE
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Editor's Note

WITH this issue we consign to the archives items of information perhaps of use to future historians—speeches and reports bearing on our state of health and lists of names and groups that played a role in College affairs during the past year.

We also report on a celebration of a celebration. On November 7, 1984 the College observed the 75th anniversary of the dedication of its current headquarters. It was not the least of a series of great events that took place in 1909—Paul Ehrlich's discovery of Salvarsan, Peary at the North Pole, Bleriot's Channel flight, and Ford's invention of the Model T automobile. Unintimidated by these feats, the Officers and Fellows of the College hailed that year with joy and thanked the generous few who built a temple to serve, in the words of President Tyson, ". . . as a library, a resort for students, authors and investigators and a meeting place for societies . . . where our Fellows can meet and discuss appropriate subjects."[1]

John L. McClenahan
The Editor

1. Tyson, James. The Annual Address of the President. *Trans Stud Coll Physicians Philadelphia, 31,* 1909, Page 1.

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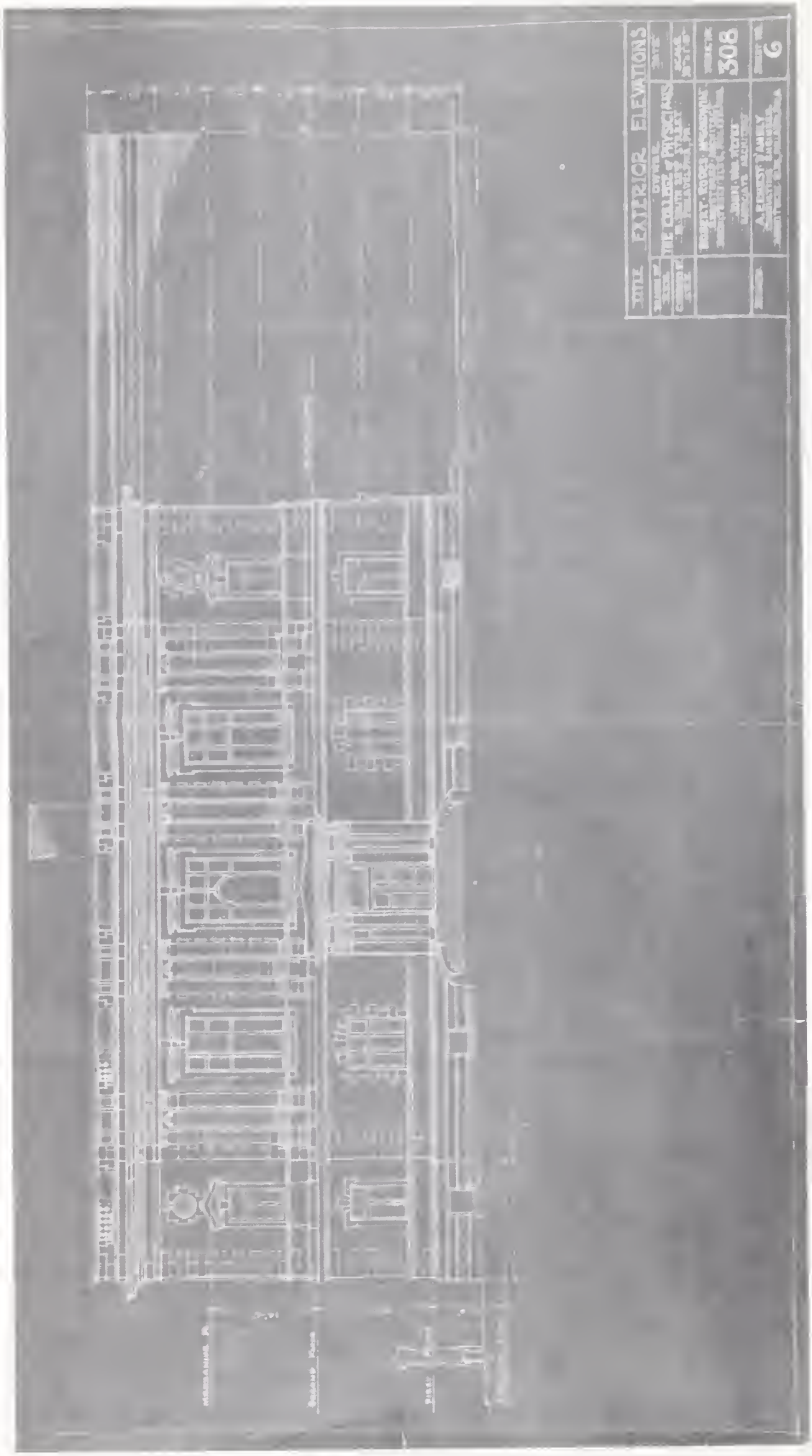

Blueprint plan for west exterior *elevation, from margin to margin, of the current* Hall of the College *of Physicians of Philadelphia, 19 South 22nd Street, Philadelphia dedicated November 10, 1908. Courtesy of the Library of the College of Physicians of Philadelphia.*

Remarks Bearing on the Construction of the College Building

PETER J. KOBLENZER

LOOKING at these magnificent premises overflowing with the impedimenta and memorabilia of our ancient profession, it is hard to believe that the College had no hall of its own until 1863. Until then its corporate being led a somewhat nomadic existence, and that particular lifestyle discouraged the accumulation of too many material possessions. Significantly, the seminal event which activated our nesting instinct was Dr. Mütter's bequest of his anatomic specimens and the endowment he contributed toward a fire-proof building to house them.

Our first home stood on the northeast corner of Thirteenth and Locust Streets. It was a distinguished building and contained meeting rooms, a noble library, and, of course, the Mütter Museum. When built with spacious rooms and in the prevailing charming colonial style, the designers must have felt sure that this building would serve its purposes for at least a century.

However, after 1863 our possessions grew exponentially, and in 1886 a floor had to be added to our original home. Only twenty years after that, in 1903, a committee report stated: "The necessity of reasonably early removal will be most apparent to those who have most frequently visited the library of late. The encroachment of shelves, stacks, card catalogue cases, and the necessary desks, typewriting machines, etc., of the Librarian's staff has invaded the reading room to such an extent that quiet work is practically impossible." We had entered the era of scientific medicine with its ever more steeply ascending publications curve.

The library at that time contained 70,000 items, and in the decade of the 1870s had been the largest medical library in the country. It was growing at a rate of 2,600 volumes per annum. It was clear that a crisis of increasing gravity was inexorably building and that something had to be done about it.

From its very beginning in the early eighteenth century, the medical profession in Philadelphia had essentially consisted of enlightened,

Presented at the seventy-fifth anniversary of the College building, November 7, 1984. Dr. Koblenzer is Professor of Clinical Dermatology, Temple University Medical School.

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dedicated individuals with a high degree of professionalism containing amongst them a number of truly outstanding individuals. This was no less true in the nineteenth century. Then as now, the College was not only a unique and invaluable resource for scholarly endeavors, but it was also a unifying factor—a neutral ground upon which physicians from the several universities met to exchange views, to learn from each other, and to enjoy the social aspect of collegiality.

They clearly wanted the College to survive and grow; and it is equally clear from a study of the archives that many, if not most, had very definite opinions as to how this might best be accomplished.

In every age and with every group, there are a few individuals that stand out; and no one can discuss Philadelphia medicine of the second half of the nineteenth century without mentioning Silas Weir Mitchell. His influence is still very pervasive seventy years after his death. Indeed, his name is still so much a part of Philadelphia medicine that two years ago during a symposium when I heard a lecturer refer to S. Weir Mitchell in terms which I thought were slightly derogatory, I took him to task publicly.

At the end of the century, Mitchell was at the very apex of his fame. He was truly a Renaissance man, and in a single decade his publications ranged from disorders of sleep, hysteria, Raynaud's phenomenon, and the effects of mescaline to poems on the passing of Tennyson, Ode to a Lycian tomb, and many others, as well as best seller novels like *Hugh' Wynne—Free Quaker.* His patients regarded him as the "American Hippocrates," and his readers and some critics compared him favorably to Mark Twain. He was a man of enormous influence, and he used it unstintingly on behalf of the College.

When money was collected for the building fund he and his family contributed $10,000, and his patients contributed $155,000 of the $300,000 needed. Every donor who gave more than $10,000 was either his patient or his friend. His friendship with Andrew Carnegie was the pivotal element which made this building a reality.

The first significant move towards this end occurred at the College meeting in January 1903 during which Dr. S. Weir Mitchell announced that he had received Mr. Carnegie's promise to give $50,000 if the College raised an equal sum. By March, 1903, the Committee on Collection had obtained $53,000 in subscriptions and this launched the College on an active program to investigate various proposals.

By early 1904 an option on this property at Twenty-second and Ludlow Streets had been secured for the purchase price of $80,000, and in March, 1904 a resolution proposed by Dr. Mitchell that the College move to this site was carried by a vote of ninety to sixty-five. This seems rather uncharacteristically straight-forward for a collection of strong-willed individuals as doctors are apt to be and, indeed, the route from Thirteenth and Locust to Twenty-second and Ludlow Streets was by no means in a straight line.

In May of 1904, only two months after the resolution to move to the 22nd and Ludlow location, a committee of five was appointed to study alternate propositions. Yet another committee had previously studied the three options open to the College—namely remodeling, rebuilding *in situ*, or moving to a different location altogether. Plans were submitted by Furness, Evans and Company for remodeling the building at Thirteenth and Locust, but this was rejected as the cost of such improvements seemed far in excess of the advantages gained. An attempt was then made to secure property in the immediate neighborhood of Thirteenth and Locust to rebuild on a larger scale, but this scheme was also abandoned for a variety of reasons. The Ludlow Street property was actually purchased sometime after a special meeting on May 29, 1904 when the motion to do so was passed by a vote of seventy-two to thirty-five. Concurrently, a building committee of six was appointed and given funds not exceeding $3,000 for securing adequate plans for a new building.

Clearly, all this activity caused a great deal of reflection, and when the committee of five surveyed the fellowship, they found essentially three groups: those who were in favor of the Twenty-second and Ludlow Streets lot, those who were opposed to building on that same lot, and the third group who were desirous of having something done and who had accepted the Twenty-second and Ludlow Streets plan because, as yet, no other plan had been presented that commended itself to them.

Those in favor of our present location felt that a beautiful and commodious building could be erected with sufficient surrounding ground as a safeguard from fire which would fill all the requirements of the College for a long period and which would allow for the erection of any additions which might be needed from time to time—prophetic words.

In order to appreciate the objections voiced about the Ludlow Street location, we must briefly transport ourselves to the turn of the century and look at what this area was like in those days. Some Fellows felt that the problems connected with the Twenty-second Street lot were insurmountable. Two objections were: "The situation is noisy from the railroads, dirty from soft coal smoke, odorous from the surrounding stables and gasworks," and that it was "A street which was once heralded as the boulevard to the park but which has now degenerated into a thorofare for drays and carts and for cattle and sheep that are being driven to the city for slaughter."

Twenty-second Street is in fact ten feet wider than all the other numbered streets in the vicinity and, judging by some of the rather magnificent residences on the street, it no doubt had at one time been regarded as a very desirable residential location. In summary, the objectors felt that "the situation of this lot is so unpromising that if the college be moved there, its influence and power would be injured for years to come."

Their concerns were further reinforced by the fact that several competent real estate judges stated that the Twenty-second Street lot which had been bought only a year before for $80,000 was now worth only $65,000. Those who wished the College to remain where it was, on the other hand, produced what they believed to be cogent evidence that in two years the Thirteenth and Locust Streets property had increased 50% in value. These figures no doubt were regarded as straws in the wind about future trends.

Having rejected the Twenty-second Street site, the committee of five went on to explore alternate possibilities. Their first consideration was the erection of a building upon the original lot at Thirteenth and Locust. They consulted the most illustrious firm of its time, McKim, Meade and White of New York City, and their plans were based upon the requirements of the College as stated by the Committee on Plans for a new college building. Furthermore, they felt that in time adjacent buildings could be acquired and the college could be enlarged without detriment to the plan that they had put forward. The building proposed was to have a frontage of sixty-five feet on Locust Street, a depth of one hundred twenty feet, and was to be four stories in height. It was to be simply and strongly constructed of concrete and steel with eighteen-inch brick walls and a plain exterior. The estimated cost which included electric light wiring and hot water heating was $90,000, or slightly under

fifteen cents per cubic foot. For a total cost of $200,000 a very handsome building with an exterior of Indiana limestone could be erected. The Historical Society of Pennsylvania which is on the southwest corner of the same intersection had recently been built at a cost of $60,000 along similar lines. Two years were to be required for the construction of the new building. The prime disadvantage of this plan was the need to move the library and Mütter Museum during reconstruction.

Other properties were also investigated, particularly the so-called Thompson property at Eighteenth Street above Spruce and also the site of two schools. The Thompson lot was obviously a very attractive site. It is where the Art Alliance is presently situated, and extends north and south between Rittenhouse Street and Manning Street and from Eighteenth Street east about 113 feet—slightly larger than the site the College was currently occupying. The asking price was $120,000, and it was argued that whereas it was not as central as their present location, it was at least in a portion of the city where property was not likely to deteriorate in the near future—its surroundings consisted of handsome residences.

Of the two schools which the city was about to abandon owing to a yearly decrease in the number of its pupils, one was on the southeast corner of the intersection of Fifteenth and Locust Streets and the other was the Grant School which was bounded by Seventeenth Street on the west, Chadwick Street on the east and Pine Street to the south. Yet another committee was formed to explore this latter site. It was the city's plan to move the school to Lombard Street in order to improve Pine Street, and a building such as the College's was consistent with this purpose. An ordinance was passed in City Council on the Twenty-ninth of March, 1905 which proposed that the site be abandoned for school purposes and be sold to the College of Physicians for $50,000.

However, the school board barred the way stating that they could not in the foreseeable future release the site. This fact together with the concern expressed about the perceived impending encroachment of slum property both at the old location and at the Pine Street site finally removed the opposition to this current location, but not without considerable rearguard action that included the consideration of yet other locations.

An interesting point was made by one Fellow who painstakingly marked the residences of all the Fellows within the city in an effort to

find the most central spot. Yet others evaluated accessibility by public transportation from various areas—evidently an important point in those days. This site did not score very high by either criterion. However, they finally crossed this particular Rubicon and in 1906 the Building Committee had sixteen meetings. The architectural firm of Stewardson and Cope was hired and bids were received.

In May, 1907 Council authorized the expenditure of $250,000. In March, 1908 this was increased to $270,000, and finally on April 27th, 1908 the big day arrived—the laying of the cornerstone.

The Reverend Ozi Whitaker, the Episcopal Bishop of Pennsylvania, officiated with a benediction. The College President, James Tyson, gave a lengthy history of the various prior homes of the College and S. Weir Mitchell laid the cornerstone. As an interesting aside, it cost forty-five dollars to erect the platform including the small derrick, the copper box for the memorabilia was four dollars, and chair rental was one dollar and fifty cents. Thereafter things moved apace. The monthly photographic record shows rapid progress. The 62 1/2 cents/hr. bricklayers, the 45 cents/hr. carpenters and 23 2/9 cents/hr. laborers obviously worked efficiently and well under superintendents at 75 cents/hr. and a Clerk of works at $150/month, and by early spring, 1909, the building was essentially complete.

That year there was a great deal of interesting correspondence about the furnishing—some of which was funded by individual donors—including the Gross Library, the Hutchinson Room, Thomson Hall, and so on. One rather elderly former President was very insistent about donating a stuffed moosehead. He urged the committee to speed up their decision and hinted rather darkly at "the narrow receptacle for which he was shortly headed." There was a very lively correspondence with W. W. Keen who was on a European tour during which he bought thirty-eight valuable books including twenty-one incunabula, and also the plaster cast of the Mundinus tablets which now adorn Thomson Hall.

In the meantime, the committee on arrangements was sending letters all over the world—chiefly to other learned medical and scientific societies in Europe and America, and to some distinguished individuals. The replies from Europe give a wonderful illustration of prevailing etiquette with their courtly hyperbole and copper plate calligraphy—the latter either by clerks or by the distinguished individuals themselves—the last great gasp of literate and cultivated communication. The

Laying the corner stone of the new College Building, April 29, 1908. Dr. S. Weir Mitchell (right, bent slightly forward) laying the stone. Behind him, wearing white waistcoat, Dr. Wharton Sinkler. To the left of Dr. Mitchell, wearing batwing collar, Dr. de Schweinitz. Seated, far right, back to railing, Dr. James Tyson. Courtesy of the Library of the College of Physicians of Philadelphia

Europeans generally declined or appointed local luminaries to deputize for them. Most of the American and Canadian invitees accepted.

Whilst all this was going on our goods were being moved from Thirteenth and Locust Streets. The task must have been formidable due to all of those skeletons and other specimens. The books were moved twenty-five volumes to a box and forty boxes per double horse team—all 90,000 of them. It must have been quite an ordeal—the Chairman of the library committee and a member of the Mütter museum committee expired during the move. Such casualties notwithstanding, the opening day finally arrived and, having assembled in the Unitarian Church at 2:00 p.m. on November 10, 1909, the procession trooped past the New Jerusalem Church on the corner, past the ornate stable that stood on the site of the herb garden and to the entrance where Dr. W. J. Taylor, the long-suffering chairman of the building committee, handed the key to the Vice-President, George E. de-Schweinitz who "accepted with pride in the nobility of its structure, with satisfaction in the amplitude of its unrivalled equipment, with rejoicing in the completion of its great and glorious plans, but not forgetting in this full hour rich in the joy of present achievement, our heritage of greatness and the example of our predecessors".

There follow encomiums by many of the living great. John Shaw Billings praised our collection on generation, sex and heredity as the most complete in the world. Charles Loomis Dana thought that the name and fame of our College would forever outshine this material monument. Reginald Heber Fitz from Boston Medical Library—now no longer an independent body—remarked that "in the development of the College of Physicians of Philadelphia, its library was at first a subordinate means to its chief object—the relief of human suffering. It would now seem that the future life of the College must depend largely upon the maintenance and expansion of its library."

In total, six distinguished visitors gave addresses. Seven associate fellowships were presented, each preceded by a suitable encomium. In all, the spoken words fill seventy-one pages of the *Transactions and Studies* of College—President Tyson's address alone covers forty. He gave a very detailed history of the College which must have taken hours to read.

Everyone surely felt blessed when Bishop Whitaker pronounced a brief benediction and the company repaired to the Bellevue Stratford

for their grand dinner. The four hundred dinner guests were entertained by speeches that extend over twenty-three pages.

The celebration concluded the next day with an open house culminating in a charming address by S. Weir Mitchell in the evening.

The affair was widely reported in favorable news coverage and frequent reference to Andrew Carnegie ("Iron Master Pleased With Library Gifts"). Miss Anna Ingersoll, a debutante guest, confided to her diary, in part: "Aunt Christine and I went to the reception at the College of Physicians . . . It is a most beautiful place, and Dr. Mitchell spoke in the wonderful hall that is in his honor . . . All the doctors in the world were there, and it was a motley gathering with all the intellectual set much in evidence and all the descendants of the ancestors who were M.D.s. Afterwards I walked about seeing the sights with Drs. Krumbhaar, Longcope and (George) Draper. The Museum is fascinating, but all of the things I really wanted to look at I couldn't with the doctors present . . . Dr. de Schweinitz was there, radiant and in his element. Now that man is a character for romance, though personally most matter of fact."[1]

By way of an epilogue, the total cost of the building, including the grounds and furnishings was approximately $400,000. In 1910 the stable next door was purchased for $45,000, thus giving us the space for the herb garden.

A minor miracle had happened: the thing had been accomplished despite committee meetings without number—I suspect, because of the pervasive and persuasive personality of Silas Weir Mitchell.

1812 Delancey Place
Philadelphia, PA 19103

1. J. L. McClenahan, personal communication.

The College Library and Its Treasures

MR. ANDREW CARNEGIE

MR. CHAIRMAN, and you, presiding officer: after listening to what our friend said, it seems to me such a descent to speak upon any ordinary subject. I would that we could have had not one word said after that address, and that we should go home with it thinking that in that half-hour's speech we had everything that would enable us to go home saying, "The most perfect ceremony I have ever attended!" (Applause.)

But, Mr. Chairman, it is ordered otherwise. Behold the victim of misplaced confidence! (Laughter.) I thought the speech-making came at the banquet to-morrow night; and, as I had engagements and had to leave to-morrow morning, I didn't have the slightest idea that I was to be called upon to address you. And then the subject—"Libraries."

"O, what a fall was there, my countrymen!"

But I find that great lights in a profession, illuminated with all the brilliant lights around them, are very apt to be just not quite as well informed upon other subjects as they might be. No man can know everything of all the professions; and your talented Chairman tonight asked me whether I was satisfied that the more than two thousand libraries I had given (and, I believe, about fifty-five millions of dollars devoted to libraries)—whether I was satisfied that they would yield a satisfactory return.

Now, I was glad he asked me that, because that gives me some excuse for answering the question. I say, that if I had to choose again what branch of usefulness I would embrace, the first thing I would do would be again to say to every community of the English-speaking race in any part of the world: "Any community that will furnish a site and maintain a free library, I devote this money to, as the best use that I can make of surplus wealth." (Applause.)

Address given at dinner on the occasion of the dedication of the present College Hall, November 10, 1909. Reprinted from Transactions of the College of Physicians of Philadelphia. 1909. Third Series. *31*:418–24.

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Ask your admirable Librarian here (because, whether a library is worth living or not depends upon the librarian)—ask him what he can tell you about Philadelphia. He will tell you that he circulated two millions of books last year, and that four millions of books were read in this city by visitors to the various libraries.

It is not what a library does that ends the account. It is quite as much what it prevents. Where would the young men be if they were not in the library? And the hundreds of letters that I have got from parents (I keep them now in a box), especially from mothers, telling me that the opening of the Free Library in their town had changed their boy; that he was there every night, and he was pursuing the subjects which appealed most to him! Now let me tell you what Mr. Thomson told the Chairman just now: A boy pursuing any profession, going to pursue a profession—an apprentice—can go into your library this year and he can get from the librarian the list of books bearing upon the very pursuit that he is engaged in. He is carried along. We find in Pittsburgh, in our technical schools, where we have already 2000 boys—we find the libraries near them the greatest benefit. They study in the technical school and they go to the library for the very authorities that are needed.

There is another point wherein the library goes to my heart. It doesn't do one thing for anybody for nothing. (Applause.) A young man has to help himself before the library will help him. (Applause.) That is another great point about a library. You get nothing for nothing, and the bright boys are those that get all the advantages from the library.

I have done rather a wholesale business in libraries (laughter), and two gentlemen in this room are responsible for getting more than 100 libraries. You and Mr. Thomson—well, Philadelphia—why, what oughtn't I do for Philadelphia? It was my second home when I was a young man. In Pittsburgh I was called here often by my superiors, that they would give me instructions; and sometimes I think I gave them a few instructions. (Laughter.)

I was great for quoting Shakespeare and other poets; and do you know, I got a great reputation among my colleagues? More than once the quotations was taken as original. (Laughter and applause.) I certainly traded on borrowed capital to a great extent in my youth.

Now, Mr. Thomson got thirty libraries—Philadelphia. I was very often here, as I told you, and I had a second home in the home of my dear friends, Mr. and Mrs. Franciscus, 1823 Chestnut; a room was there for

me, kept for me, to be taken advantage of at any time; so that I claim kindred with you people of Philadelphia, and I gave those thirty libraries with intense satisfaction. But this gentleman, Mr. Billings—well, the gallery may not have heard as much of him; he doesn't play to the gallery so much as to these learned gentlemen below; he called one morning, and he walked out of my house with a little document giving him seventy-eight branch libraries (applause)—the greatest wholesale order (and yours the second) that I have ever had the advantage of filling. Throughout the days afterward occurred congratulations: "Hello! I congratulate you, Mr. Carnegie; I congratulate you." "Hold on!" I say; "what for?" "Why, for giving New York seventy-eight branch libraries." "Can't accept your congratulations. But if you will congratulate me upon having induced New York to sustain seventy-eight libraries, open to all the people, shake!" (Applause.)

Now, I rate the money I give as of very trifling moment, comparatively. And I say the money that a community itself gives to open a collection of books, the people's university, to all the people—I say that is the action that counts, that is where money tells; and what I give may only be considered as the fly with which we catch the fish. So much for libraries.

But, Mr. Chairman, I may say that I come by library building by inheritance. My father was a poor weaver in Dunfermline; and there stand the records that he was one of five that bunched his books and opened them on a little stand in his room—shop—for all the people to read; and that library was moved seven times, from one place to another, always to grander quarters. He furnished the first library for Dunfermline, and his son had the privilege of establishing the present library. I have never known a lineage for which I would exchange that of a library-founding weaver. (Applause.) So much for libraries.

Now, one word more and I am done. I hope I have answered your question?

Mr.——: You have, really!

Mr. Carnegie: Now, this is a doctors' meeting; this is the medical profession, and we have heard how it has progressed; and no profession has obtained greater victory over ignorance than the medical profession—none whatever. What you have recounted there, that is history; but there is much to be desired yet from the medical profession. I hear so many different views given as to the right mood—of doing this way, that, and the other, and what is best. It reminds me of my friend Josh Billings

in his almanac. You know he printed a paper once a week, and a feature was, "Answers to Correspondents;" and one correspondent writes:

"My Dear Editor: I see in all the papers that they have discovered that fish—fish is the best diet for producing brain power, because of the phosphorus; but there isn't any editor that is wise enough to tell us what kind of fish is best"—and that is the trouble with your profession. Well, Josh Billings answered:

"In your case, try a whale or two." (Laughter and applause.)

Now, the gentlemen of the medical profession must—and of course they will—they must, because they followed science and the star-eyed goddess of Truth, they will eventually come to some settled conclusions; so that we men, anxious to have long life and good health, and everything of that kind, will know just exactly what kind of fish it is that we should each take.

Gentlemen, I came to Philadelphia tonight at the call of one whom it is a delight and an honor to obey. When I settled upon the research commission which is now, I am delighted to say, attracting the attention of the whole world for its work, I wished all the parts of the country to be represented; and there was one man in Pennsylvania, right here in Philadelphia, that I had heard enough about and—and then I inquired from various people, and I said: "I will address Weir Mitchell and ask him to represent this section of the country." (Applause.) Of course, he responded. From the acquaintanceship then formed it has ripened into friendship, and it has passed the friendship stage and ripened into admiration, and it has passed that stage of admiration, and I say, now, I have reached the stage of genuine love and affection for that man. (Applause.)

I believe this to be the apotheosis of his career. I cannot believe that anything can be produced in Philadelphia—and, of course, it won't count if it is produced anywhere else; nothing, no triumph, no ceremony, no honor can be bestowed upon him that can quite equal this night, at the very apex of his life; and I account myself happy that I am here present tonight, that I look upon this scene, and that I know that as long as memory holds its seat in my brain, in my happier moments I will revert to this great night, where I met you all, and where I sat next Weir Mitchell; and as I speak the word, it doesn't—it doesn't lessen my affection and my love for him to know that there is a wee drap blood atween us. (Applause.) We trace our heritage to Scotland!

"And may dishonor blot my fame,
And quench our household fires,
If me or mine forget thy name—
Thou dear land of our sires!"

He is not a more triumphant-democracy American than I am. That man don't live. Every day that I return here, every time I think of it, Ah, I think of the glorious democracy! Six lines from Burns, I heard John Morley say, held the doors of the empire; six lines of Burns affected the political thought and progress of the world more than all the editorials that have ever been written; and what were those lines? He said to me, "I need not ask you if you know." I said, "No; I know two of them." What? Burns—his call to the Republic when she was struggling:

"Columbia's offspring, brave and free,
Still flaming fire in danger's band,
Ye know, and dare proclaim,
The royalty of man"—

—and these are two of the lines from Burns.

Weir Mitchell showed me a book with Burns's name in it tonight. He was a good American before America was; and we are good Americans now in our lifetime, and we will die good Americans. (Applause.)

One word and I am done. Here he stood today, here he sits; and all that can accompany old age he has—honor, love, obedience, troops of friends, and all these you have, my friend, and the record you leave behind you, of which none of your survivors will feel ashamed. (Applause.)

Medicine and Surgery in 1909

GERT H. BRIEGER

SUMMARY: There was no single medicine or surgery by 1909. It was a time of increasing scientific involvement in medicine as well as the eve of several major reform movements in public health and medical education.

I BRING you greetings on this seventy-fifth anniversary of your building from a relatively young school in Baltimore, as well as from your sister society, The Medical and Chirurgical Faculty of Maryland. I was pleased to find, and admittedly a little surprised, that on May 13, 1909, William Osler gave an address he entitled "Old and New" on the occasion of the opening of the new building of the Medical and Chirurgical Faculty of Maryland. He used on that occasion what he called a bidding prayer. I suppose that as it was appropriate then, it is appropriate here in Philadelphia at this venerable college today, as Osler put it, to offer thanks for the liberality of founders and benefactors—those in their generation famous and in ours never to be forgotten.

To focus narrowly on a single year such as 1909 will produce a strange and distorted view of the history of medicine and surgery of that period. Yet, as is probably true of almost any single year, 1909 turns out to be of much more than passing interest. I will, in the next few minutes, give you some examples of things that happened in the year this college moved into its new building. Artificial as the resulting picture turns out to be, a closer look at this one year which is now three quarters of a century removed from us does have some merit.

It turns out that 1909 was indeed a memorable year. Just to cite a few examples, it was the year during which the sixteenth amendment to the Constitution was passed to take effect in 1913. This was the individual income tax, and it was joined by a congressional bill in 1909 that instituted a tax on the net income of corporations. I hardly need tell you of the importance of these two pieces of legislation for philanthropic giving and the subsequent effect upon medical research and medical education.

Presented at the program in honor of the seventy-fifth anniversary of the current College building, November 7, 1984. Gert Brieger, M.D., Ph.D. is Director of the Johns Hopkins Institute for the History of Medicine.

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The year 1909 was about the midpoint of the two wonderfully rich decades between the turn of the century and World War I that are usually referred to as the Progressive Era. Historians have identified several important themes that apply to medicine as they do to the rest of society. An increasingly common belief of the time was that science would provide answers to virtually all problems. In medicine, as elsewhere, we see the added impetus to make theory and practice increasingly scientific.

Americans during these years also tended to rely on schooling to provide answers to problems that were social, economic, and political in nature. Herbert Croly, whose very popular book entitled *The Promise of American Life* appeared in 1909, firmly believed that the American national promise could be fulfilled only by education. Thus it was not chance that in the first decade of the century the American Medical Association renewed its efforts to reform American medical education. These years were a time of increasing concern on the part of the professions for redefinition of the proper, that is, more rigid, criteria for admission to their ranks.

To paint for you a picture that would be at all-representative of the world of medicine and surgery in 1909 is well-nigh impossible. The main reason for the difficulty, as well as the immensity, of the task is that there was not one medicine but many; and to complicate things further, 1909 was precisely the period when very marked changes in the relationships between practical medicine and the now so-called scientific medicine were becoming every more sharply delineated. It was also the period that witnessed an immense increase in the number of hospitals and hospital beds, so the pressures to keep them occupied would cast a still different light on the traditional ways of doctors and patients.

There were, then, several medicines and several surgeries we could describe for 1909. Country practice (about which much was being written at the time) differed from the urban variety, especially if the latter was of the evermore prevalent specialty type. The disappearance of the old country doctor was already being lamented. We generally tend to associate the steep rise of specialism with the middle decades of this century. But already in 1909 medical journal editorial writers were lamenting that, unfortunately, every student and young graduate was seeking to take up a specialty at the earliest possible moment. Certain features of medical practice, of any type and at any time, may have common features. These are the enduring qualities of practice described

by George Engel and others. They include the complementarity of need for help and a desire to provide service, and that the personal encounter between patient and doctor is the keystone of medical care.

For a convenient glimpse of country practice around 1909 one may turn to any number of autobiographies and biographies. You probably need not go much further than to read the description offered by Sinclair Lewis in *Arrowsmith.* Shortly after his graduation about 1910, Martin Arrowsmith spent an unsuccessful year in South Dakota as a rural practitioner. His trials and tribulations, his observances of fellow practitioners, and his frustrations are probably quite typical.

I recommend to you also the brief sketch of the family practice described so well by this afternoon's S. Weir Mitchell Lecturer. Dr. Lewis Thomas has recently written about his father's practice on Long Island around 1911. He tells us of the economic difficulties of the physician in practice, of the limited means of effective therapy, and of the demanding, yet satisfying, life of the family physician.

Despite the difficulties, a physician's duties were clear. Dr. Thomas describes what his father tried to do. He was expected to walk into the sick room and take over the situation. One can imagine the sigh of relief when he appeared in the doorway—a sensation we, as patients, may still experience. Second, Dr. Thomas's father would expect to see his patients through their crises. He would stand by or be readily available. And third, perhaps most important, he would explain what happened and what was likely to happen. Prognostics has played a prominent role in medicine since the time of Hippocrates.

Perhaps one of the most momentous medical activities occurring in the year 1909 was the concerted effort by the American Medical Association, with very active support from the Carnegie Foundation, to bring about continued reforms in medical education. Nineteen hundred nine was the year during which Abraham Flexner, usually accompanied by Dr. Nathan Colwell of the AMA, criss-crossed the country inspecting medical schools from Maine to California and many points between. I shall return to the report that resulted from these inspections in a moment.

The medical world of 1909 was also witness to two major reports resulting from the work of committees of one hundred, a rather characteristic phenomenon of the Progressive Era. Both reports, one on public health and the other on medical education, would have implications far broader than merely for the world of medicine. This, too, is characteristic of the time we are commemorating.

The larger of the two reports was published by the Government Printing Office under the title *Report of National Vitality, Its Wastes and Conservation.* It was prepared for the National Conservation Commission, appointed by President Theodore Roosevelt, and written by Irving Fisher, an economics professor at Yale and a man passionately involved in enhancing the quality of life by improving people's health.

Fisher's own bout with tuberculosis in 1898, when he was a thirty-two-year-old man, probably explains his great interest in health and vitality. We should also remember, as Edward Otis pointed out in a book in 1909, that he estimated the country's annual mortality from tuberculosis to be 150,000 people, and that 1,250,000 were sick with the disease in 1909. The conservationists, who advocated a scientific management of our natural resources, clearly now included health as one of our precious national resources. This report of 129 printed pages contains far too much for a simple short summary. It is important for our purposes because it provides a ready picture of health and longevity as observed by Fisher and his committee. They were able to show, as had public health reformers for several generation before them, that over-all mortality rates were slowly decreasing, but urban life was still less healthy than rural in many sections of the country; that black mortality was higher than white; and that while some of the common infectious causes of death and disability were on the decline—the chronic and degenerative disorders common in our own time were already beginning to become prominent.

Much of this long report is about conservation through hygiene, both public and personal. "In the practice of medicine," Fisher pointed out, "the tendency is progressively to give up the use of violent drugs, and to depend more on hygiene." This turn toward preventive medicine is very characteristic of the time. It may be seen in Flexner's Report, and in 1909, when Charles William Eliot was ending his forty-year presidency of Harvard, he said in his final address to the medical faculty that he was most pleased that Harvard now had the good prospect of establishing a chair of preventive medicine. That these sentiments about the central role of prevention in the work of the doctor, as time would reveal, proved to be more wishful thinking than reality is a subject worthy of a larger study.

The second Committee of One Hundred which reported in 1909 was appointed in the previous year by the American Medical Association's Council on Medical Education, then in its fifth year of very active

work. This committee consisted of ten separate groups of ten men, each charged with the task of evaluating the medical curriculum. Divided along disciplinary lines, the groups wrote reports about the current status of teaching and ways of achieving an ideal curriculum in the subjects of anatomy; physiology and physiological chemistry; pathology and bacteriology; pharmacology, toxicology, and therapeutics; medicine, including pediatrics and nervous diseases; surgery; obstetrics and gynecology; diseases of the eye, ear, nose, and throat; dermatology and venereal diseases; and the tenth group which was charged with the subjects of hygiene, medical jurisprudence, and medical economics. The ubiquitous Professor Irving Fisher served as a member of this last group.

The report of the medical educators varied in detail and thoroughness from group to group. It appeared in the bimonthly publication *The American Medical Association Bulletin* nearly a year prior to the much more famous Flexner Report. The Committee of One Hundred did not receive the same publicity, but their report certainly supports those who argued that the Flexner Report said little that was new. What both the Committee of One Hundred report and Flexner's more detailed survey do tell us is that concern for improvement in medical education was one of the foremost topics of interest to the medical profession at the time this building was dedicated.

I will not further attempt to compare and to contrast the report of the Committee of One Hundred with the Carnegie Foundation's Bulletin Number Four. One brief paragraph from the sub-committee on physiology of the AMA does deserve notice. It still speaks to curriculum committees seventy-five years after it was written:

> Our subcommittee wishes to put on record its opposition to any curriculum requiring more than thirty hours work a week. We believe the medical schools have gone mad in allowing their curricula to be built up on the basis of the mere addition of the hours demanded by the instructors. Educational authorities in colleges of arts and science express amazement at the pedagogical imbecility of medical educators who crush out all individuality of their students, depress their ideals to the one desire to pass off their subjects and make of them, as one teacher recently expressed it, mere stuffed sausages.

One final point of similarity—the Committee of One Hundred, as well as Abraham Flexner, stressed that the ordinary medical school should prepare the student for the general practice of medicine. Science

was to serve as the underlying base for the knowledge required for effective practice. Neither report really wanted more from undergraduate medical education.

I would like to call your attention to some of the positive statements made by Flexner about the conditions he and Colwell found in 1909. His negative comments are more quotable, hence they have so often been repeated.

Flexner said in the Report that, ". . . there is no denying that especially in the last fifteen years, substantial progress has been made." He then pointed to the lengthened and graded curriculum that was being adopted by more and more schools. He praised the fact that pure didactic teaching was on the wane, and that clinical teaching facilities were improving. He was also pleased to note that more and more of the discreditable commercial medical schools were being forced out of business. Nothing should obscure the fact, Flexner noted, that ". . . we have at this date perhaps thirty institutions well equipped to teach the medical sciences in laboratories usually of modern construction, invariably of modern equipment."

The number "thirty" is of interest, because Flexner believed that ultimately the country would be well served if it had thirty-one good schools of medicine. So, conditions in 1909 were perhaps not quite so bad as we generally believe. Although, admittedly, many very inferior schools still existed side by side the good ones.

The flood-tide of science flowing into medicine began with the generation that came to maturity in the 1860s and 70s. By 1909, science in medicine was no longer a debatable topic, but firm consolidation of science and medicine would be the task and the accomplishment of the generation coming to maturity in the years just after the turn of the century. This generation was typified by men such as Rufus Cole, Harvey Cushing, Henry Christian, David Edsall, Eugene Opie, Simon Flexner, and scores of others. Samuel Meltzer, who was a little older and to whom I will return, helped to serve as an important bridge between the old and the new. We must also remember that an earlier generation, that of Welch and Osler, had begun in the 1880s and 90s to institutionalize what may also be referred to as the new medicine, one firmly based upon science and the laboratory.

Rufus Cole's career may serve as a vivid example of the conditions in 1909 because he was just then beginning his highly successful career as first physician-in-chief of the newly established Hospital of the Rocke-

feller Institute. Cole serves as a particularly interesting bridge between the old and the new because he was William Osler's last American resident and then became the first to serve Lewellys Barker when Barker succeeded Osler as Professor of Medicine at Hopkins in 1905. Cole also typifies the new generation because in his major research work he concentrated on a single problem, the basic biology of pneumonia, then the leading cause of death.

I want, however, to say a few words about Dr. Samuel J. Meltzer. An important signpost on the road to an increasingly scientific medicine in the first half of this century was the founding of the Society for Clinical Investigation in 1908. The early members were mainly young physicians living in the Eastern United States and working as clinical teachers in schools of medicine. According to their constitution the only requirement for membership was residence in the United States or Canada, active practice of medicine, and the accomplishment of ". . . a meritorious original investigation in the clinical or allied sciences of medicine . . .". Thirty-two men accepted the original invitation, many of them in their thirties. This new group very much represented the spirit of their time, one in which the Progressives encouraged a firm belief in the value of science as a means of progress for society. Unofficially the group was proud to be known as the Young Turks, after the real Young Turks who caused a sensation in 1908 by daring to revolt against Sultan Abdul Hamid and eventually bringing about major reforms in the Ottoman Empire.

The medical Young Turks in America were dissatisfied with the slow progress of support for their work in clinical research. They had few opportunities to present papers at the staid meetings of the Association of American Physicians (founded in 1885). But more important, the younger generation of physicians interested in advancing the knowledge about health and disease, was less rebellious, less in protest, than may appear by their somewhat cocky nickname. This was a new generation asking new questions, and using methods of the laboratory in their research that were not familiar to their elders. Over and over they said that not just physiology, biochemistry, and pharmacology were sciences, but clinical medicine, too, was a science in its own right. The key would be to integrate the work of the pre-clinical with the clinical scientist. The old medicine was a unit. Its leaders felt perfectly comfortable in the belief that they could master it all. By the early twentieth century several of the sciences of medicine had broken away and quite clearly

established their own domain. What then was left of the old main stem of medicine was clinical medicine.

Dr. Samuel J. Meltzer, the moving spirit behind the founding of the American Society for Clinical Investigation and a true pioneer of clinical research in America, noted in his presidential address at the first meeting in 1909 that medicine should no longer be viewed merely as an applied science. To do so was both logically erroneous and practically harmful. Clinical medicine, Meltzer stressed, was now to be seen as a closely interwoven link between elements of pure science and the real practice of medicine that contains elements of science as well as art. "To clinical medicine," he said to his younger colleagues in the society and to the world at large, "is left the study of the phenomena [of disease] and their sequence as they occur in a living body during the entire course of a disease . . . . In other words, the domain of clinical research comprises the study of the natural history of diseases, their physiology and their pharmacology."

Science and practice of clinical medicine should go hand in hand, Meltzer urged. This was the secret of the success of nineteenth century medicine in Germany, the land of his medical and scientific training. It was a style much admired by Americans. Meltzer firmly believed that the secret of success of scientific medicine in Germany was that her medical leaders were men of science first and that the practice followed logically, but was clearly the secondary object. Now, in America, Meltzer exhorted his colleagues, "Clinical medicine must reclaim some of the brainy young men who were enticed by the sciences of medicine."

Meltzer represented not only the symbol for the new medicine that would come to set the stage for the subsequent decades of this century, but he also was a representative of the Rockefeller Institute, founded at the beginning of the century and destined to play a major role as a center for the production of medical knowledge until the upsurge of federal money in the years after World War II. While not the only endowed center for medical research in the early years of the century, the Rockefeller Insitute was certainly responsible for a large share of the slowly burgeoning knowledge of such fields as biochemistry, immunology, experimental surgery, and infectious diseases. Moreover, it served as an important symbol, depicted in a caricature as the McGurk Institute in Sinclair Lewis's immensely popular novel, *Arrowsmith.*

When the clinical researchers founded their own society in 1908, they did so partly because they were now asking different questions and

using newer methods to investigate the natural history of diseases than had their older colleagues. But they also were impatient for a forum and were generally denied the right to present their ideas to the meeting of the prestigious Association of American Physicians. A decade and a half later they chafed at the delay, often up to a year, which they encountered when they submitted a paper to a medical journal. The *Journal of Experimental Medicine,* founded in 1896, represented mainly the research carried on in the pre-clinical laboratories. So in 1924, the American Society of Clinical Investigation cautiously launched its own means of publication, *The Journal of Clinical Investigation.*

So far I have said little about surgery in 1909, yet it was just the period when both thoracic and neurosurgery were beginning their spectacular developments. Nor have I been able to say much in detail about disease, its prevention, diagnosis, or therapy. I would like to refer you to a very convenient source of information for the state of medicine in 1909. Some years ago my Baltimore colleagues, Drs. A. M. Harvey and V. A. McKusick brought out *Osler's Textbook Revisited.* In it they published selections from his widely used book together with commentaries about the events in the subsequent six decades. It is of interest to us on this anniversary occasion that the two editors chose the seventh edition (1909) of Osler's text, the last one on which he worked entirely alone. It is both informative and entertaining reading.

While it is certainly true that seventy-five years later a much different textbook is required, the amount of medical information contained in Osler's edition is remarkable. Thus Osler's sentiment expressed in Baltimore in 1909, to pay a proper tribute to the generation of physicians famous in their day and not to be forgotten in ours, is a good note on which to commemorate this building's first seventy-five years and to wish you all well for the next seventy-five.

Institute for the History of Medicine
Johns Hopkins University
1900 East Monument Street
Baltimore, MD 21205

Eakins's Agnew Clinic
The Medical World in Transition

DIANA LONG HALL

SUMMARY: The portrait of the Agnew Clinic, a graphic depiction of the beloved and respected gentleman retiring from active medical practice, reveals a successful teacher and surgeon who possessed the gift of "making the boys yell" with appreciation. An artist first, and then a scientist, in a setting of casual antisepsis he wields a precise yet compassionate knife against the scourge of breast cancer. The scene presents other intimations as well: an understanding that his patient on the table was incurable and that the operator's aim was cosmetic and psychological relief— and that in the year 1889 ideals in surgery were shifting away from those, strictly humane and devout, of Agnew. *The Agnew Clinic* records, in a sense, a farewell to earlier persuasions.

ON May 1, 1889, Thomas Eakins' portrait of the the Agnew Clinic was unveiled during medical commencement ceremonies at the University of Pennsylvania. The artist painted it in honor of his friend, David Hayes Agnew, the retiring Professor of Surgery, who had just passed the age of seventy. The occasion was festive, the audience anticipating among other speeches, a farewell address by William Osler who was about to leave for his new post at Johns Hopkins Medical School. They were not disappointed; the address was his famous call for the students to "take with you into the struggle the watchword of the good old Roman—AEQUANIMITAS."[1]

In contrast to the scene, at that moment graduation services were being held in an empty ward across the campus of the University of Pennsylvania for the second class of student nurses. The two events intersected at one point. A graduating nurse, Mary Clymer, winner of the Nightingale Medal, was one of the two women depicted in the portrait of the Agnew Clinic.

The portrait was unveiled on "Agnew Day", as it was named by the president of the graduating class, Joseph Allison Scott. Among the students in the audience was Jeremiah Adams who was to marry the surgeon's niece Mary Irwin Agnew, and who was destined to be Dr. Agnew's biographer. The author of the most famous memorial to

Dr. Hall is Director of the Francis Clark Wood Institute for the History of Medicine, College of Physicians of Philadelphia.

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Agnew, J. William White, third John Rhae Barton Professor of Surgery, was also there to see himself portrayed suturing the patient's skin after her simple mastectomy while Dr. Ellwood Kirby administered the ether.

Distinguished citizens rose to pay tribute to Dr. Agnew in the moral and religious terms that characterized Victorian culture and medicine. His close friend and pastor, the Reverend John S. MacIntosh spoke of him as one of the Christian saints: "He was a gift, a glory, and a benediction." S. Weir Mitchell, who accepted the portrait for the university trustees, attempted to sum up the meaning of Agnew's life. The lesson that students should take from this surgeon, he said, was moral: "Whenever you become involved in doubt and uncertainty, think what Dr. Agnew would have done, and you will do the right thing." Indeed, all of Jeremiah Adams's account is worth reading for its tone as well as substance, embodying, as it does, the symbols and rhetoric of the time. The story of Agnew's retirement to his contemporaries was a solemn ritual and also a human drama.

At the presentation, responding to deafening applause, Dr. Agnew rose and offered his students a light witticism. He concluded with a line that has since been widely quoted by departing pedagogues: "So, now that I have retired into comparative ease, if life should become unbearable to me, I shall still retain the consolation of going across the river occasionally to hear the boys yell."

Following loud acclaim, Agnew was just turning to his seat when he staggered. The audience was horrified, but he caught himself immediately, turned to the students and said, "I wish you all success in your profession." Equanimity, indeed (p. 335).

One cannot study the portrait under discussion without coming to the conclusion that it reveals far more than the artist intended, however perceptive Eakins might have been. Julius Comroe points out that however idealized the view, Agnew's antisepsis was primitive at best, showing ". . . no sign of cap, mask or gloves on the operating team. An eager, unscrubbed audience is leaning over the railing, almost touching the surgeon and perhaps breathing on the patient's open wound."[2] And this is twenty-two years after Lister had published his treatise on the antiseptic principle.

Perhaps one reason for the continuing appeal of the painting as a symbol of modern American medicine is that it can be viewed not only as a scientific drama, but also as a moral one. Agnew's biographer

described his life as a pilgrim's progress from family and childhood to maturity and greatness. The story begins with his devout Scotch-Irish ancestors in rural Pennsylvania, and a family run on the patriarchal and Christian principals characteristic of the American middle class whose stereotypes of manhood could be cast as "Masculine Achiever" and "Christian Gentleman".[4] His father, a successful country doctor, took natural pride in observing that even as a child his son had wanted to be a doctor while his mother never questioned his Christian devotion. Agnew, the pilgrim in Adams's story, moved steadily ahead towards these complementary ideas of success and service—with some falterings and hardship.

The model of this character building is both hierarchical and dynamic. The stages of life from childhood to retirement and death (the transition to eternal life) were clear to Agnew and his contemporaries. The priorities of this life Agnew summed up as "Be true as a man (then) a doctor and (then) a citizen."[2] Good medicine was a consequence of the good life. The moment in this story that Eakins has caught dramatically, is the time when Agnew's active professional life was ending, but his most important life, as a Christian Gentleman, has reached a new stage of influence at home and in public. It was a time when, in the eyes of both surgeon and biographer, a growing segment of medicine and public life was peopled by those who were by no means Christians or gentlemen.[5]

Agnew and many of his contemporaries also believed that it was not enough to be enterprising and devout in the world of medicine. One had to be male. It will be recalled that Agnew resigned his appointment at the Pennsylvania Hospital rather than admit women for training in the surgical clinic. He resumed work later at the hospital only on the unspoken condition that he would not have to teach women in mixed company with men. The spectre of venereal disease in the male viewed by a woman was too formidable, reinforcing Agnew's concern that while these realities might bring some disillusion to the hearts of men it would be insupportable for women. Agnew's great fear for all doctor was that they would become hardened and lose their ideals in the practice of medicine. For men, balancing the goal of success with that of service, some hardening was inevitable. For women, governed by a different set of gender ideals, it was unnecessary and wrong.

Hints of these gender ideals are evident in *The Agnew Clinic*. One nurse, the traditional angel of mercy, is present. She stands as well for modern

ideals of professional training and competence.[6] The second woman in the painting is easily overlooked as the object of the surgery. There is no question as to her sex, for the object of surgery is a breast. The patient, unconscious, is perforce the image of female passivity, while anesthesia has spared her the suffering characteristic of breast surgery a generation earlier.[7]

It should be noted, too, that this was a *simple* mastectomy. Would the surgeon, facing his students, be justifying such a limited procedure? Agnew had made one trip to Europe and had returned convinced that American surgery was superior to that of the French or German because of its concern for the patient rather than the procedure of the profession. His textbook reflects a most humane, gentle approach to the sick. In cases of breast surgery he entreats the physician to know the patient's social and physical history, her means as well as her health. This was crucially important in cases of breast cancer which Agnew tells us are incurable with surgery. Quoting, but not naming, Sir James Paget he declared, "I do not despair of carcinoma being cured in the future, but this blessed achievement will never be brought by the knife of the surgeon."[8] Technique, he taught his students, was never to be perfected purely for its own sake or for experimental purposes.

In examining Agnew's conservative views of surgery as a feature of patient care Adams, his hagiographer, attempts to justify his subject's lack of original contribution to medical science. He was, we are told, a practical surgeon rather than a brilliant scientist, and from Adams's efforts to defend this stand we deduce that he was concerned about the increased stress society was placing on the latter. Agnew, it seems, was not to be viewed as anti-science but—and the point is crucial—he regarded science as the established body of knowledge and not its unexplored terrain. For all its display of white gowns and painless surgery, there is no hint in *the Agnew Clinic* of the possible subordination of medical or social convention for the advancement of science, an ideal popularized forty years later in Sinclair Lewis's *Arrowsmith.*

In 1889, however, Agnew could see the beginning of a medical practice based on new ideals. The new Johns Hopkins Medical School which opened its doors in the autumn of 1889 to male and female students appeared to some to represent a threat to old medical values. As William Osler was delivering his legacy of *Aequanimitas* to the University of Pennsylvania, William Halsted was preparing to move from New York, where he had begun his studies of breast surgery, to the

The Agnew Clinic *by Thomas Eakins (American, 1844–1916). By permission, University of Pennsylvania Collection. Gift of the Three Undergraduate Medical Classes.*

new school in Baltimore. Histories of surgery report this move, and the work of Halsted on a curative mastectomy, as a milestone in the development of scientific medicine. To mid-twentieth century judges, Halsted's creation of the radical mastectomy and techniques for speed and safety in surgery seem crucial. To Agnew, Halsted's work fit the pattern of German surgery with its "excessively one-sided laboratory studies."

Clearly, Agnew did not judge the value of breast surgery in terms of local recurrence rate, as did Halsted, but rather by whatever comfort and quality of life it could restore to a patient.[10] Like Victorians who treated tuberculosis "with lies and opium," Agnew taught his students to lie to patients about the dim prognosis of their cancer and to sustain hope by bringing comfort. To sustain this lie, and to make his patients more comfortable, he further counselled the surgeon to operate even in cases where surgery would shorten life. Today,this life-shortening surgery would be anathema, and by 1892, in the case of breast cancer, Halsted treated Agnew's practice of palliative surgery with scorn.

A generation apart in age, Halsted and Agnew belonged to medical worlds that differed in medical ideals as much as medical technique. By 1889, the medical and social worlds of surgery were changing in the direction of scientific and cultural ideals that Agnew personally rejected. *The Agnew Clinic* captures a moment when Agnew was revered and loved for his ability to say good-bye to those worlds.

Francis Clark Wood Institute
College of Physicians of Philadelphia
19 South 22nd Street
Philadelphia, PA 19103

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Dr. Richard Mead and the Motto of the College of Physicians of Philadelphia

DAVID RIESMAN

ONE day last spring I accidentally discovered that the motto of our College, "Non Sibi Sed Toti," was used as his personal motto by a famous eighteenth century London physician, Dr. Richard Mead. I was intrigued and made an effort to trace the origin and history of the motto. Did the College borrow it from Mead? Was it originated by the College or was it taken from a common source? The search naturally led me to a study of the life of Richard Mead who in his day occupied a position not unlike that occupied a little later in Philadelphia by Benjamin Rush, although Mead was personally far more popular than the autocratic Rush.

He was physician to George II, and held many other distinguished offices and was elected President of the Royal College of Physicians but for unrecorded reasons declined to serve. While pursuing my studies in the life of Mead I came across some interesting historic facts which though not directly connected with the motto seem to be of sufficient importance to recount.

Dr. Mead was one of the five historic characters who carried the Gold-Headed Cane. Those who have read the delightful tales which the Cane tells either in the rare early editions (1827, 1928) or in the more recent ones edited by William Funk (1884), Francis R. Packard (1915), George C. Peachey (1923), or Herbert Spencer Robinson (1932), will remember that John Radcliffe was the first owner of the famous Cane. Who the Cane's ghost writer was is nowhere indicated in the text or on the title page of the original editions. The modest author, Dr. William Macmichael, preferred to remain anonymous. Radcliffe was an eccentric bachelor who held the fashionable practice of London in the hollow of his hand. In his declining years he took a fancy to Richard Mead, gave him rooms in his own house in Bloomsbury Square and

An abridged version of the address delivered at the Anniversary Dinner of the College of Physicians on December 51, 1934 which appeared in Medical Life. *April 1935:187-201. David Riesman, M.D., ScD. (1867–1940) was Emeritus Professor of Medicine and Professor of the History of Medicine at the Medical School of the University of Pennsylvania, Philadelphia.*

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pushed him forward in practice. Unlike the rather crude but shrewd Radcliffe, Mead was a well-rounded scholar, familiar with Latin and Greek, and a gentleman in bearing. He soon acquired a lucrative practice that brought him as much as £7000 a year, equal to about $85,000 in our present day currency.

Mead did much of his prescribing in coffee houses where apothecaries would come to him with their difficult cases and he would prescribe at a half a guinea, or even a guinea, for each consultation without even seeing the patient. Nevertheless Mead was no quack as can be deduced not only of what we know of his exceptional education but from other facts in his life. I have already mentioned, in proof of his distinguished place, some of the professional positions he held. Alexander Pope, the Wasp of Twickenham, who was not a respecter of persons, immortalized him in the lines:

> "I'll do what Mead and Cheselden advise
> To keep these limbs and to preserve those eyes."

Mead had studied medicine under the great Boerhaave in Leyden and had taken his degree in physic and philosophy like so many other Englishmen in Padua, apostrophized by Shakespeare as "nursery of arts."

On returning to England in 1695 Mead began the practice of medicine in his native town of Stepney. Soon, however, he moved to London and became physician to St. Thomas' Hospital and a Fellow of the Royal Society. Oxford gave him the degree of M.D. in 1707.

When the Plague broke out in Marseilles in 1719, the British Government appealed to Mead for advice. He declared the disease contagious and wrote his famous book, "A Short Discourse Concerning Pestilential Contagion, and the Methods to Be Used to Prevent It." Seven editions appeared in one year. It is, as Sir George Newman says, the first record[1] of epidemiological advice produced by a medical practitioner at the request of the State.

For the prevention of the disease Mead recommended: "(1) the preventing of its being brought into our island, (2) if such a calamity should happen, the putting a stop to its spreading amongst us." For the first he advised a system of quarantine and considered that "the best

1. Newman, G. *The Rise of Preventive Medicine.* London. 1932:157.

method of stopping infection is to separate the healthy from the diseased." He advocated the establishment of a Council of Health, notification of infected families, the non-infected to be stripped of all their clothes and washed and shaved before going into new lodging, cleansing of the houses, goods to be burned or buried deep. Mead stoutly maintained that all expenses should be paid by the public and a reward be given to the persons who first discovered the infection.

In the same book he chides the French doctors for opposing the common opinion that the Plague is contagious. And he writes further: When the profession of physick came to be founded upon the knowledge of nature, Hippocrates strongly opposed the opinion that some particular sicknesses were divine or sent immediately from the Gods and affirmed that no diseases came more from the Gods than others, all coming from them yet all owning their proper natural causes. Contagion is no more than the effect of volatile offensive matter drawn into the body by our smelling.

The people of Marseilles, writes Mead, tried to clear themselves of the Plague in a different manner. Some poor man offered himself to be maintained at public expense with delicate food for a whole year. After this he was led across the city dressed in consecrated garments and herbs and being laden with curses as he went along that the evils of citizens might fall upon him, he was at last thrown into the sea.

Mead was the author of many works on medical subjects. His book on Poisons had an extraordinary vogue during the eighteenth century and was reprinted many times in England and on the continent. Among other subjects he discusses hydrophobia, the disease he says should have been called (Duscatoposis), difficulty in swallowing rather than (Hydrophobia), a dread of water. The injudicious jumbles of Theriacas' specific antidotes, etc., whether old or new, deserve no notice. That ridiculous preservative, the liver of the mad dog which Pliny says should be eaten raw rather than boiled, is neither good food or physic. Galen observed that it availed nothing.

"There are two or three remedies recommended, I think, upon rational ground; the first is the *Ceneres cancrosum fluviatilium*, ashes of the river crawfish. These were prepared by burning the fish alive upon a copper plate with a fire made from the cutting of twigs of the white briony. This Galen avers that nobody ever made use of without success and before him Dioscorides assured that it is a medicine which might be relied on."

Mead's own method of treatment is as follows: "Let the patient be blooded at the arm nine or ten ounces. Take of the herb, called in Latin *Lichen cincereus terrestris*, in English Ash-colored ground liverwort, cleaned, dried and powdered, half an ounce. Of black pepper powdered, two drachms. Mix these well together and divide the powder into four doses, one of which must be taken every morning, fasting, for four mornings successively, in half a pint of cow's milk warm. After these four doses are taken, the patient must go into the cold bath, or a cold spring, or river, every morning fasting for a month: he must be dipt all over, but not stay in (with his head above water) longer than half a minute, if the water be very cold. After this he must go in three times a week for a fortnight longer." In some parts of the world, even in America, according to Mead, patients with hydrophobia were stifled between two feather beds.

"To conclude, if any relief could be expected in this desperate state, I think it would be from large bleeding, even *ad animi deliquium*, before the fibres of the membranes and vessels have lost their natural force by convulsions; nitrous medicines; and plentiful diluting with cooling subacid liquors. But after all it will generally happen that death will be the physician that cures." Mead was the first to advise surrounding the abdomen with a bandage after tapping for ascites.[2] A strong advocate of inoculation, he helped Lady Mary Wortley Montagu in popularizing the practice in England.

In his Harveian Oration Mead maintained that physicians had enjoyed the highest esteem in Greece and Rome, a contention that brought down upon him the abuse of Conyers Middleton, a vituperative, unorthodox divine who described medical men in Rome as slaves. Mead also wrote a rather fantastic treatise on the disease of Biblical characters[3] as well as one of the influence of the Moon and Sun on disease. The latter has a distinct astrological tone and is perhaps the illegitimate outgrowth of Sir Isaac Newton's discoveries with which Mead, who attended Newton in his last illness, was familiar. Though a follower and admirer of William Harvey he seemed to be unaware of the great discoveries made by Mayhow, Robert Boyle, Christopher Wren and others.

2. Mead, R. *Medical Precepts and Cautions.* Second Edition. London. 1755:164.

3. Stack, T., English Trans. *Medica sacra, sive de morbis insignioribus qui in Bibliis memorantur commentarius.* London, 1755.

Mead was one of the first book collectors on a large scale. His library, consisting of upwards of 10,000 volumes, was disposed of soon after his death in 1754. The sale required 28 days and according to the auctioneer's catalogue of 242 closely printed pages in the library of the College of Physicians the books brought the sum of £730. After his death it was said of him that of all physicians who had ever flourished he gained the most, spent the most and enjoyed the highest fame during his lifetime, not only in his own but in foreign countries.

* * *

When Mead was 70 year of age he went to Paris to receive lessons from M. Dupre, the famous dancing master. His explanation is worth noting. "I am not ashamed to say that what the majority of mankind perform for pleasure I undertake for health; and having found myself every day less able to go through the sedentary drudgery of my profession, I thought the amusement of a journey to Paris and a little gymnastic exercise under 'Doctor' Dupre might, by varying the scene, be useful to my constitution; and I already find the advantage.

It is strange that there is nothing in Mead's voluminous writings to indicate whence he chose the motto; at least I have not been able to find any reference to the subject nor is there any clue in the Proceedings of the College of Physicians why the motto was chosen by the Founders. A study of the records shows that the meeting of the College at which the motto was adopted was held on February 6, 1787, at the "University." By University was meant the College of Philadelphia, also called the Academy, at 4th and Arch Streets.

* * *

The Committee appointed at the previous meeting on January 2, 1787—the first meeting of the College in history—to prepare a device for the Seal of the College, consisting of Drs. Benjamin Rush, Benjamin Duffield and Samuel Powell Griffitts, produced a drawing for the purpose—An Ancient Lamp upon a Doric pedestal, on the front of the Pedestal the Motto—

"Non Sibi Sed Aliis."

Around the whole Device:

SIGILL: COLLEG: MEDICOR: PHILADEL: INSTITUTI: A.D. 1787

On consideration, the Device for the Seal reported by the Committee was agreed to, with the word "Toti" substituted for the work "Aliis." Unfortunately it is not recorded who moved to substitute *toti* for *aliis*. I wonder, was the mover of the motion acquainted with Mead's writings? As Mead was one of the most distinguished medical authors of the eighteenth century, copies of his works must have been circulated in this country; they were no doubt brought back by some of the Philadelphians who had gone to London and Edinburgh to study. Benjamin Duffield himself had been a student at Edinburgh and must have been acquainted with Richard Mead's writings.

It is interesting that the position of the Motto beneath the Doric column and inside the ribbon on the College Seal is similar to the position of the Motto in the small picture of Mead's Library reproduced in The Gold-Headed Cane.

The finished Seal with the Motto was produced on March 6, 1787 by Dr. Benjamin Duffield and on August 7 of the same year it was reported that a copper plate for striking the certificates had been procured. The Seal and diploma were first discussed in conjunction and it is obvious that the former was primarily designed as an appendix to the latter. Unfortunately the earliest certificate in the possession of the College is that of Joseph Hartshorne, dated 1824, but there can be little doubt that

those of 1788 bore the Seal and that it was first used on them. The legend on the diploma of 1824 and of other dates differs in its abbreviations from the legend as given in the Minutes of February 6, 1787. In the 1824 diploma the Seal was stamped directly on the diploma in dark blue.

The Motto without the Seal had its inaugural use in the first volume of the Transactions of the College published in 1793, six years after the founding. Curiously, there is neither Seal nor Motto in the volume published in 1846, also called Volume I, and containing the Transactions from November 1841 to August 1846 inclusive. Volume I, New Series, published in 1853, bears the Motto on the title page in thick black capital letters. The heraldic device with the Garter ribbon is printed for the first time in Volume I, Third Series, published in 1875, the Seal bearing the words Acta Coll. Med. Philad. Instit. A.D. MDCCLXXXVII. In the book plates of the Library the word "Acta" is replaced by the phrase "Ex Libris."

Through an amusing inadvertence the noble mahogany desk in Mitchell Hall is carved with the Ex Libris Seal of the Library. One can sit on books but one can hardly read a desk. There are slight differences between the earlier and the later bookplates. In Vol. I, 1875, and in accessions to the Library of that period, the Lamp of Knowledge burns with a much brighter flame and illuminates a much larger area than is the case at present. Whether that means that the College throws less light upon the world now than in the past or has grown more modest, I must leave for future historians to decide.

The unknown member of the College who suggested the change in the Motto from *aliis* to *toti* could hardly have done so on the score of improving the Latin for the word *toti* is altogether inappropriate in the manner in which it is used. In truth, "non sibi sed toti" is not translatable. *Toti* is a qualifying adjective and cannot stand alone; it needs a noun for support. If however, we attempt an English rendition it is: Not for one's self but for the entire . . . ", an unfinished sentence that demands a collective noun to complete it. As my own knowledge of Latin syntax is so ancient as to be unreliable I applied for enlightenment to my friend, Professor Roland G. Kent of the University of Pennsylvania, who writes as follows: The Motto, "non sibi sed toti" can mean only "not for self, but for the whole," the significance of which is clearer in German: "Nickt Für sich, sondern für das Ganze."

It seems to be an error for "non sibi sed omnibus," which is cited in lists of Latin phrases and means "not for self, but for all," or "nicht für sich, sondern für Alle." Unfortunately *totus* does not denote or attach to a numerical plurality, but only to a thing or mass in its entirety: one may say *totus populus* "the entire people," but must say *omnes cives* "all the citizens." There is not even an antithesis between *sibi* and *totis*, since it would be perfect Latin to say that he found that this treatment was good *sibi toti* "for all of him" and not merely for the part of him which the treatment was intended to benefit. The only way in which *non sibi sed toti* can mean what it is evidently intended to mean, is to supply a collective noun such as *generi humano*, and then translate "not for self, but for the whole, the entire (human race) or for all (mankind)."

I myself looked for the Motto among standard Latin Quotations but was unable to find it there. Several friendly Latinists were equally unsuccessful. It became evident that the Motto as it stands could not be a proverb of Classical or Medieval Latin; hence it appeared to me that it must have been coined either by Mead himself or by someone else whose Latin was weak and that the man who moved its adoption by the College against the better 'Non sibi sed aliis" probably did so out of respect for Richard Mead.

I had therefore practically given up all hope of finding the origin of this perplexing phrase when suddenly in continuing my researches in Mead's writings I discovered to my great delight the source of the doubtful Motto. At the end of Mead's Discourse on Measles (A Discourse of the Smallpox and Measles, by Richard Mead. To this is subjoined the Comentary of Rhazes, a most celebrated Arabian physician on the same Diseases. Translated from the Latin, by John Theobald, M.D., London, undated, but probably 1747) I found the following quotation:

"Nec sibi, sed toti genitum se credere mundo."

Not to believe himself born for himself, but for the whole world.

Finding it I felt "like some watcher of the skies when a new planet swims into his ken." The line is taken from the second book of the Pharsalia of Lucan (Verse 383) and in its complete state is applied by the poet to the rigid (durus) Cato of whom he also speaks the beautiful and sonorous line:

Servare modum, finemque tenere, naturamque sequi: to hold the golden mean, to keep the end in view and follow nature.[4]

4. This verse is quoted by Mead in *Monita et Precepta Medica,* London, 1751:152.

Mead in taking over the phrase from Lucan either did not recognize or calmly ignored the fact that "toti" governs "mundo," thus posthumously laying us open after all these years to having a Motto of questionable, indeed of indefensible, Latin legitimacy. Age cannot hallow nor custom sanctify so grevious a linguistic blunder. Perhaps the College will some day be inclined to rectify it by simply adding from Lucan's original verse the single word "mundo"—"non sibi sed toti mundo"—not for himself but for the whole world. Then will the Motto in spirit and in phrasing be worthy of the traditions and the dignity of our venerable College.

REVIEW

COHEN, MICHAEL MARTIN, M.D., *Dr. Cohen's Healthy Sailor Book.* 257 pp, illus. Camden, Maine: International Marine Publishing Company, 1983. Price $17.95.

Reviewed by KAIGHN SMITH

DR. COHEN'S *Healthy Sailor Book* is appropriately entitled. Surprisingly, it has little to say about disease and much to say about staying healthy. Dr. Cohen's background in neurology shows through clearly and is particularly noticeable in his chapters on "Seasickness" and "Sailing Vision," where neurologic physiology is discussed perhaps a little too deeply for the average layman.

Most books and pamphlets on medical matters pertaining to the sailor are made up of lists of medicines which should be taken including various kinds of sutures, forceps, catheters, I.V. solutions, etc. There is no such compendium in Dr. Cohen's book. The book is a frank discussion of how to stay comfortable at sea from the point of view of health. The only chapter on diseases is very short in order to describe those communicable problems that might occur when one goes ashore in a foreign area (travelers' diarrhea, for instance). Also the rather long chapter on hazardous marine life that indicates the amount of poison in some fish, crustaceans, and jellyfish is somewhat ponderous and over emphasized.

The rest of the book is devoted to seasickness, heat, cold, nutrition, vision, exercise, fatigue, and psychology. All make very interesting reading for anyone who is in command at sea, either in a small boat or in a commercial large vessel.

There are many items which, as a deep water sailor, I did not know. For instance, throughout there is a warning against giving alcohol to the victim of any illness or injury. Indeed, the warning is so firm that I have the impression we can make most problems worse by its use. I did not know that there are two types of seasickness—one which causes nausea and vomiting and the other which leads to a severe

Dr. Smith is Chairman of the Department of Obstetrics and Gynecology at Lankenau Hospital, Philadelphia.

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debilitating depression. This latter I have experienced in storms and never knew that I was suffering from seasickness. The discussions of hypothermia, heat stroke, and their treatments are complete, understandable, readable, and very informative.

Particularly interesting is a concise discussion of choosing a watch-keeping system in order to conform as well as possible to the circadian rhythms of human beings. Also, I enjoyed the chapter on keeping in shape; very difficult to do on the water on a small sailboat.

Incidentally, I learned for the first time that sailing in the Bahamas requires polarized dark glasses because glare reflected from the water is polarized light and should be filtered out if one wants to see coral heads efficiently.

Doctor Cohen does not go into the prevention of injury at sea in any detail. There is nothing, for instance, on how to keep one's finger out of a winch while letting a line off, or the value of a boom preventer to avoid skull injuries in the event of a windward broach. Safety belts, cabin hand holds, life jackets, man overboard equipment, and techniques for rescue are not part of this book. That is all right, however, because what is in it has not been published before and needs the new approach that Dr. Cohen takes. I would recommend this book to anyone who goes to sea.

Suite 433
Lankenau Medical Building
Philadelphia, PA 19151

REVIEW

MARTY, MARTIN E. *Health and Medicine in the Lutheran Tradition: Being Well.* 178 pp. New York, 1983. Price $14.95.

VAUX, KENNETH L. *Health and Medicine in the Reformed Tradition: Promise, Providence, and Care.* 149 pp. New York:Crossroad, 1984. Price $14.95

Reviewed by GARY B. FERNGREN

THESE volumes are the first in a projected series intended to "show how the beliefs and practices of the various faith traditions shape and are shaped by encounters with issues in health and medicine." The series has been commissioned by the Lutheran General Medical Center in Park Ridge, Illinois, as part of its Project Ten. The study focuses on ten general themes (well-being, sexuality, passages, morality, dignity, madness, healing, caring, suffering, and dying) as they are informed by the respective insights of the major religious traditions. Studies of other religious perspectives (e.g., Jewish, Roman Catholic, Hindu) are currently in preparation, but it is appropriate that the co-editors of the series have written the first two volumes.

Martin E. Marty is a well-known and prolific church historian. He writes (as does Vaux)as a practicing member of the tradition that he describes. Lutheranism, which has its roots in Germany and Scandinavia, represents the third largest Protestant grouping in North America. It is to Marty less a theological point of view than an historic tradition representing a wide spectrum of beliefs. He highlights certain long-standing emphases in Lutheranism and tries to bring them to bear on contemporary issues in health and healing that center around the ten themes of Project Ten.

Marty approaches the Lutheran heritage with respect, but selectively and critically. Recognizing that many of the themes dealt with are approached in similar ways by other religious traditions, Marty seeks "not uniqueness but distinctives." His approach is more sociological than theological or historical, with an emphasis on changing attitudes and beliefs. There is much discussion of what Lutherans do (and have

Dr. Ferngren is Professor of History at Oregon State University.

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done) in areas related to medicine, less on what they should do, i.e., the approach is "descriptive" rather than "prescriptive." Marty points out that Lutherans have not traditionally stressed matters of health and healing. They have been less prone than many other religious groups to seek miraculous healing and generally are content to seek healing through ordinary medical means. Nor have they proscribed smoking or alcoholic beverages. The book is most useful in those sections where Marty tells us how particular Lutheran emphases inform specific issues. His discussion of abortion is particularly sensitive and helpful in clarifying the complex issues involved from the Lutheran perspective.

Kenneth L. Vaux has published extensively on ethical issues in modern medicine. He deals with the other major European branch of Protestantism, the Reformed tradition, or Calvinism, which has its roots in Holland, Switzerland, France, Scotland, and parts of Germany. It is from this heritage that the Presbyterian, Dutch Reformed, and Congregational churches sprang. The tradition is rich and diverse, and Vaux draws on much of it, from John Calvin, its founder, to theologians, ethicists, and physicians in our own century. In general the Presbyterian tradition has shown a greater interest in questions of medicine and health than has the Lutheran tradition. Vaux has a deep appreciation of this background and is at pains to draw out the implications of its particular emphases for modern medicine.

Vaux exploits his tradition's theological background better than Marty does. However, he is not always a reliable interpreter of it, and the volume is open to criticism by the specialist for many errors of fact and interpretation. His strength lies in his identifying the characteristic themes of Calvinism (e.g., providence, vocation, the possibilities and limits of human potential) that can be appropriated by those concerned (either as patients or health-care professionals) with matters of health and medicine. In Chapter Four ("Acting Human: Life's Choices and Destiny") Vaux describes how Protestant Christian ethics differs from alternative value-systems that inform medical ethics today. A helpful feature of the volume is the series of "Case Studies" included in each chapter that deal with specific problems in contemporary medical ethics (e.g., "Caring with Scarce Resources").

One area that needs more extensive treatment in both volumes is mental illness. While one of the ten themes treated is "madness," no serious attempt is made to explore the complex relationship of psychology and religion. This is a subject on which much has been

written in recent years and one which readers are likely to miss. Both authors have a tendency to incorporate insights of contemporary writers of many points of view into their own traditions. While this may be said to reflect an ecumenical spirit, it does blur distinctions between religious heritages that perhaps need to be emphasized.

Since these volumes are the first in a projected series, some suggestions might be offered for making future titles more useful to the general reader. It would be most helpful to begin each volume with a brief historical sketch of the religious tradition being described. Today few members of any religious body (let alone those outside the tradition) know even the most elementary features of their history and background. A second chapter should present a simple statement (in layman's language) of the major theological emphases of the tradition in a more systematic way than Marty and Vaux have done. Since most religious groupings include diverse elements, a short description of the different strands (e.g., liberal and conservative) of the tradition as they currently exist would aid the reader. A third desideratum is an index for those who need to discover quickly what the tradition has to say about any particular issue. A glossary of theological, medical, and technical terms might be helpful as well in orienting the general reader. Finally, foreign words and phrases should be translated in the text.

Contemporary issues in medical ethics often seem to be discussed in a vacuum. They need the kind of theological and historical perspective that these volumes offer. Marty and Vaux have made a promising beginning in a series that should help to fill that vacuum. These volumes will be particularly useful to those in the health-care professions who wish to know what their own or someone else's religious perspective has to say about a whole spectrum of concerns that impinge on their field.

Department of History
Oregon State University
Corvalis, OR 97331

REVIEW

MELZACK, RONALD and WALL, PATRICK D. *The Challenge of Pain.* 447 pp, illus. New York: Basic Books, 1982. Price $20.95 (revised edition of *The Puzzle of Pain*)

Reviewed by THOMAS GUCKER, 3RD

THIS is the type of book one prefers not to put down. A principal reason is the urge to determine if there is "a new science of pain control." In about 400 pages, the authors, a professor of psychology and a professor of anatomy, do an outstanding job of dealing with algology. The book is clearly written and divided into four major segments: "The Puzzle of Pain," "The Physiology of Pain," "Theories of Pain," and "The Control of Pain."

There is an excellent historical presentation with names and dates of discoveries and both clinical and research findings of chronological events in the understanding of pain. Truly pertinent situations and cases are clearly presented. There is a very adequate list of references near the end.

The section, "The Puzzle of Pain," delineates the inadequacy of correlating physical injury with the patient's perception of pain. There are times when a patient complains of severe intractable pain without any objective evidence of physical abnormality. As yet, there is no satisfactory explanation of this phenomenon. Concerning the psychology of pain, we are introduced to the complexities of the effect which past experiences, attention, anxiety and distraction have on the patient's subjective report of the degree of his suffering. The tremendous importance of the "placebo effect", including those from surgery, is stated. Repeated use of placebo medications produce less and less relief, and the mind-set of a patient that is based on his unique past history is obviously important.

It is essential to differentiate between several varieties of pain: acute, recurrent acute, and chronic. Pain research has not yet achieved a

Dr. Gucker is Clinical Professor of Orthopedic Surgery at the University of Southern California School of Medicine, Los Angeles, California.

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totally adequate definition of pain. Phantom pain in a limb—causalgia, neuralgia, and especially post-herpetic,—remain unexplained. They respond variably to a number of types of treatment. The duration of the symptoms and the time when treatment is initiated make a tremendous difference in effectiveness. In fact, a very crucial determination is the time when pain becomes chronically intractable. When this condition exists, it must be dealt with in a manner entirely different from that which is used with acute pain.

The section on "The Physiology of Pain" gives an excellent update on the findings of recent research. The concept of a "pain center" in the brain has been replaced by a concept of a "complex interaction among multiple structures involving most of the brain and parts of the spinal cord." The authors' "gate-control theory" first introduced in 1965 is described and further elaborated.

"Theories of Pain" further describes the implications of the gate-theory involving the ascending-descending interactions of neural impulses. One provides pain-producing impulses; the descending impulses are inhibitory. Many assumptions are required to provide the explanations of the prolonged effects of referred pain.

"The Control of Pain" considers the four major approaches: pharmacological, surgical, sensory modulation and psychological. The subjects include: addiction, tolerance, and side-effects. The effects of salicylates and narcotics are compared. Narcotics initiate the natural opiates, the endorphins and enkephalins which are produced in areas of the brain and spinal cord.

Neurosurgical approaches to pain control include interference with input of "pain" impulses (destruction of peripheral nerves, rhizotomy, tractotomy, cordotomy, thalamotomy) produce variable results and are now reserved for patients with intractable pain from cancer. Sensory control of pain depends on activation of inhibitory mechanisms such as electrical stimulation of the dorsal column and the periaquaductal gray and thalamus. Results in chronic intractable pain have led to limited indications for intervention.

Psychological control of pain, such as operant conditioning without controlled studies, has not proven superior to other less expensive methods. These include relaxation, autogenics, trancutaneous electrical nerve stimulation, biofeedback and acupuncture. Psychometric studies for prognosis are stated briefly.

There is a portion of the book devoted to orthopedics. Lower back and neck pain, for example, is the most common of all pains and is attributed to discogenic disease and arthritis principally. References properly indicate conflicting results from various forms of treatment which lack adequate controls. Surgery, although contraindicated, produced temporary relief—possibly only because of the placebo effect. Scientific research methods have been used when possible but findings in animals cannot be directly applied to humans. Experiments to determine neurologic physiology in normal humans have not been performed in patients with chronic intractable pain. This has multiple causes and therefore multiple therapies are required.

Ideally this book should be available at multidisciplinary organized algology centers. As Hamlet put it: "There is nothing either good or bad but thinking makes it so."

55 East California Blvd.
Pasadena, CA 91105

REVIEW

SHEPHERD, GORDON M., *Neurobiology.* New York: Oxford University Press, 1983. 611 pp., illus. Price $49.50, cloth; $29.95, paper.

Reviewed by F. STEPHEN VOGEL

ONE looks down the phylogenetic scale, marvels at the magnificence of even the primitive nervous system, notes the gradual upward evolution to man, and wonders why cognition is so abruptly species specific.

The early chapters of this fine text emphasize phylogenetic development and cell biology. They concern complex, yet ordered, anatomy and biochemical properties that serve for nerve conduction and synaptic transmission. Subsequent individual chapters provide concise, yet remarkably thorough, accounts of the functional anatomy of the sensory and motor systems. These discussions advance the reader into a consideration of the cerebral centers for vegetative control: the biorhythms, feeding, mating, emotion, and behavior. We then arrive at the last chapter and are privileged to a scientific analysis of learning and memory.

One is still uncertain why cognition is species specific, but we have been caused to think. Moreover, there is an awareness that this has been a delightful experience which has provided intellectual pleasure cover to cover.

For members of the "clinical" neurosciences (neurology, neurosurgery, neuroradiology, neuropathology, and psychiatry) who repeatedly encounter neuronal dysfunction and disease, it is most refreshing to revisit the splendor of the normal nervous system and to do so through the lucid prose and explicit line drawings of this exceptional text.

Department of Pathology
Duke University School of Medicine
Durham, NC 27706

Dr. Vogel is Professor of Pathology at Duke University School of Medicine.

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REVIEW

Cope's Early Diagnosis of the Acute Abdomen. Revised by William Silen. 16th ed. 284 pp, illus. New York: Oxford University Press, 1983. Price $21.95, cloth; $12.95, paper.

Reviewed by CHARLES FINEBERG

DR. WILLIAM SILEN'S revision of Sir Zachary Cope's *Early Diagnosis of the Acute Abdomen,* resulting in the 16th Edition of this revered classic, does justice to the author and the first edition.

I know of no other publication which would present a more difficult task for revision. This classic which has served the surgical profession through the years emphasizes clinical diagnosis based on careful history and examination.

Dr. Silen, in his wisdom, has changed very little of the original text and then only to update rare areas of possible debate. In doing this, Dr. Silen comments that there is remarkable agreement between himself and Dr. Cope.

New chapters which were necessary are "Post-Operative Abdomen," "Recurrent Appendicitis," and "Post-Emetic Rupture of the Esophagus," and these have been added.

This publication continues to be most sincerely recommended for the medical student, house officer, and those physicians who desire the basic knowledge for the thorough and accurate diagnosis of the acute abdomen.

902 Locust Street
Philadelphia, PA 19107

Dr. Fineberg is Professor of Surgery at Thomas Jefferson University.

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REVIEW

BERRY, HARRISON M., ed., *Emergency Physician's Guide to Dental Care.* 122 pp, paper, illus. Philadelphia: University of Pennsylvania Press, 1983. Price $25.00.

Reviewed by JOHN HAMILTON, comment by PARKER SEYMOUR

THIS manual, which resembles the *Little, Brown Spiral Manuals*, is designed to provide a convenient reference for diagnosis and treatment of dental problems which are likely to bring patients to an emergency room.

It is organized with a "complaint locator" cross-referenced to appropriate sections of the text. This is followed by a group of chapters dealing with the more commonly presenting problems. There is a chapter each on local anesthetic and radiographic technique. It concludes with several useful appendices on suggested medicaments, materials and instruments. Presumably, the author's intent is that the "complaint locator" will serve in place of an index, since none is included.

The illustrations and diagrams are very well done and add immeasurably to clarity and conciseness. In Dr. Seymour's experience, all problems likely to be seen in an emergency department are covered. Our joint opinion is that some of the procedures and treatments suggested are overly detailed and therefore impractical for the emergency room setting. There may be an intent by the authors to provide sufficient scope so that those readers who are inclined to proceed to more definitive treatment would not need to refer to another text.

The chapter on trauma is excellent. It strikes a nice balance between emergency management and definitive treatment. The section on bleeding is sound, but brief. It would be stronger if more practical suggestions for dealing with a very anxious bleeding patient were included. The subsection on pericoronitis and periodontal abscess could be confusing. It seems to suggest that a treatment approach of

Dr. Hamilton is a staff Oral Surgeon at Chestnut Hill Hospital—former Professor of Oral Surgery, Temple University. Dr. Seymour is an Emergency Department staff physician at Chestnut Hill Hospital.

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infiltration local anesthesia and curettage is advisable for both conditions, an approach that is rarely needed in pericoronitis. Infiltration of local anesthetic solution in the retro-molar fossa may extend infection into vulnerable areas. Systemic antibotic therapy with analgesics is almost always the initial treatment of choice and is well-suited to an emergency room.

The chapter on local anesthesia presents excellent techniques, clearly described. However, some are difficult, especially for the infrequent user. Indicating which are simple, intermediate or difficult would be helpful.

I believe this is the best manual available for the purpose intended and should prove to be very useful.

33 East Chestnut Hill Avenue
Philadelphia, PA 19118

REVIEW

PERKINS, WILLIAM H., PH.D., ed. *Hearing Disorders* (a volume in the series, *Current Therapy of Communication Disorders*). 170 pp. New York: Thieme-Stratton, 1984. Price $14.95.

Reviewed by ROBERT A. HENDRIX

THIS book is written primarily as a resource for the practicing clinical audiologist or speech and hearing therapist. It consists of thirteen chapters by twenty-one various authors, edited by William Perkins, providing an overview of habilitation strategies for the hearing impaired. The chapters are arranged in order of chronological age, from infants, preschool children and school age children to young adults, adults and the elderly. Varying degrees of hearing impairment including deafness are discussed. The importance of the development of normal language skills, voice and articulation as well as audition is emphasized in the therapeutic process for the young patient. For adult and elderly patients, aural rehabilitation is the central focus.

Each chapter is intended to be a complete, self-contained, personal description of the author's treatment method and, as such, the material in various chapters is quite redundant. This is particularly noted when each author outlines the principles on which his treatment approach is based. As a resource for the therapist, each chapter often has step-by-step instruction, and it seems a workbook format might have been more appropriate for many of the chapters. One chapter which this reviewer found of more general interest was that written by Pruitt-Shough and Garwood reviewing public school speech and language programs for the hearing impaired.

This book may be of use to the physician as an aid in determining the level of habilitation the patient has obtained and may further help the physician to decide if additional therapy is needed. It does provide developmental goals by age and indicate when various therapies should be instituted. It also gives specific examples of ways to encourage

Dr. Hendrix is Assistant Professor of Otorhinolaryngology and Human Communication at the University of Pennsylvania School of Medicine.

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speech and listening behaviors by the deaf or hearing impaired infant or child. It may also aid the physician in counseling parents. Nonetheless, the book would be of most use as a reference to individuals directly involved in the habilitation and rehabilitation process.

Hospital of the University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104

REVIEW

DRACHMAN, VIRGINIA G. *Hospital with a Heart.* 254 pp. illustrated. Ithaca: Cornell University Press, 1984. Price $19.95.

Reviewed by DOROTHY M. BARBO

AN immigrant to America, Marie Zakrzewska came to find opportunity denied her in Europe as a woman in medicine in the nineteenth centry. Instead she found that though a few women could attend medical school they had no place available for clinical experience and professional training. Her story is one of struggle and heart as she established the New England Hospital in Boston to provide opportunity for women when they were shut out of male-dominated hospitals, practices, and professional societies. Her genius was her ability to bring together the leaders of the Women's Rights movement and expand it into the field of medicine. Women physicians later returned the favor by actively participating in women's clubs and lectures. Perhaps it is necessary to remind young readers of the strong opposition to women in medicine then. Even Philadelphia's famous son—Dr. Charles Meigs of Jefferson Medical College said that "a woman's head was almost too small for intellect but just big enough for love." Dr. Edward Clarke of Harvard Medical College argued against coeducation explaining that women's reproductive physiology made it unsafe for them to undertake any intellectual activity with the same right as men. Excessive study he explained, diverted energy from female reproductive organs to the brain, causing a breakdown in women's health and threatening the health of future generations." Her task formidable, Zakrzewska had learned the importance of powerful male allies when she was a midwife in Berlin. Visionary men like Doctors Samuel Cabot and Henry Bowditch were her allies. These same struggles were paralleled in other cities of Baltimore and in Philadelphia at the Women's Medical College of Pennsylvania. The author skillfully integrates facts into a moving story of the conflicts to secure a professional workplace and colleagueship which had been denied to females.

Dr. Barbo is Associate Professor at the Medical College of Pennsylvania.

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Women doctors were not content with winning the battle to practice separately. Instead the growing number of women physicians seized the banner of sexual equality and refused to be separatists. In the dawn of the twentieth century, hospitals ceased being institutions of charity and moved to a more scientific method of diagnosis and treatment based on research. Leaders of the New England Hospital chose separatism and idealism and lagged scientifically which left them behind and eventually lead to the closure in 1969.

This story is well written and readable though at times redundant as it portrays the valiant efforts of women poineers in medicine. Students of medical history will enjoy this look backward. Younger women in medicine should read this volume to know from whence they have come before charting tomorrow's course.

Medical College of Pennsylvania
3300 Henry Avenue
Philadelphia, PA 19129

REVIEW

COHODES, DONALD R. and KINKEAD, BRIAN M. *Hospital Capital Formation in the 1980s.* Baltimore: The Johns Hopkins University Press, 1984. 136pp. Price $25.00, hardcover.

Reviewed by GEORGE ROSS FISHER

This book is just about perfect in every way, including the fact that it is quite short. The authors provide us with a simple, clear and fair description of how the American hospital system finds itself with an appalling problem, and the book has been published just as Congress is getting ready to consider solutions.

The appalling problem for hospitals is the huge debt they have incurred in the past several years in order to construct or reconstruct the entire set of national hospital buildings. The nation's hospitals have never had such outstanding physical facilities, but there are about fifty billion dollars in hospital municipal bonds in circulation, most of them floated at the peak of recent high interest rates. Perhaps the magnitude of the interest burden is clarified by a recent zero-coupon bond issued by Uniontown, Pennsylvania. A hundred thousand dollar face value bond, which comes due in twenty years, can be purchased today for eleven thousand dollars. That is, the citizens of Uniontown have obligated themselves to pay $100,000 for the use of $11,000 for twenty years. Fifty billion dollars in hospital bonds thus represent a national obligation in excess of half a trillion dollars.

Cohodes and Kinkead lead us through the history of how this situation came about, sympathetically and without being either judgemental or apologetic. We are introduced to considerations Congress was facing in 1983 when the DRG (payment by Diagnosis Related Groups) law was passed. Congress didn't know what to do about capital building costs, or about the hidden educational costs in Medicare, but Congress was determined then and there to pass a prospective payment system. So educational and capital costs were made exceptions. Hospitals are reimbursed for Medicare's share of the actual interest on their

Dr. Fisher is Chairman of the Council of Medical Econimics of the Pennsylvania Medical Society.

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loans, and also repaid a fixed portion of the principal. Even though this system of cost-plus reimbursement had been a major incentive for overbuilding, it was hard to see an alternative which would not interfere with a prospective payment system, and so the problem was swept aside for later resolution.

Now it is late and Congress is asking for suggestions about what to do. Almost any proposal which would tighten up the availability of capital would have an impact, more on some hospitals than on others. Proprietary hospitals, rural hospitals and those with a large teaching or charity load would certainly benefit or suffer unequally. It is hard to see how any fiscal stringency at all could fail to be hard on charitable hospitals. Two main proposals are in the trial-balloon stage. At one extreme, it is proposed that present cost reimbursement be continued, but limited within a fixed government budget and apportioned among hospitals through a governmental rationing system. At the other extreme, it is proposed that all hospitals simply be given an extra seven percent bonus on their DRG payment. For some, the bonus would pay off the recent buildings, for others it would be a fund out of which future buildings would be financed. Neither of these solutions is completely attractive, and quite a long list of objections can be identified. With the present surplus of hospital beds, now made more severe by the prospective payment system, it is hard to know whether certificates should be saleable pieces of property, or whether past interest reimbursement levels should be transferable to new owners or merger partners, particularly if the mortgage is refinanced. Non-profit hospitals might elect to go out of business and reemerge debt free. But one thing is certain: no matter what the solution, there will be winners and losers. It seems very likely that those who read this little book will be better prepared to defend their particular type of institution, and make their views known to Congress. Congress doesn't pretend to know much about medicine, but it may have to listen.

Suite 308
829 Spruce Street
Philadelphia, PA 19107

Presidential Address

BROOKE ROBERTS

BEFORE my actual report, let me take this opportunity to express to the College Fellowship my deep appreciation for the honor which you have bestowed upon me in asking me to serve as President of our College during the last two years. This is a great institution, and one with which I am honored to be associated. I thank you for the privilege of being allowed to serve as your President.

The seas on which the College has sailed during the last two years have not been entirely smooth. We have been buffeted by some adverse winds and waves, but we have also been favored by some helpful winds and currents. Let me first run through the problems that have beset us, and these have largely to do with financing.

The first serious financial problem that developed had to do with the loss of the contract from the National Library of Medicine. During the previous few years we had come to depend heavily on money generated by this contract, and when we were not continued as the regional library following contractual consolidations it resulted in a distinct drop in our income. In addition, there was a decline in revenue from our Medical Documentation Service which resulted in part from the recession that caused various of our users to reduce their purchase of service and in part from our own failure to meet their needs. We believe this situation has been remedied, and our volume of work from this source is again increasing. In the long run, it may well prove to be a very healthy thing for us to be free of our former dependence on the Federal Government contract. Be that as it may, these two reductions in revenue plus our ever increasing expenses resulted in a situation that left us with a deficit last year, and there is a deficit anticipated for the present year which I hope and believe may well be eliminated before the year's end.

Among other problems that beset us is the fact that many of our staff, which are able and devoted, today are underpaid; and we must see our way clear in the near future to being more competitive in salaries, or

Presented at College Night, October 3, 1984.

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run the risk of losing some of our key personnel. In addition, within a couple of years we are going to have to expand our stack space in order to take care of our constantly growing number of volumes. There are many other things that we need to do, such as adequately catalog our Historical Collection—all of which reguire time and expenditure of funds which we do not have availabe at this time.

On the other hand, as I mentioned, we have had some favorable winds, and I can report with pleasure some definite accomplishments during the past two years. First of all, there are some favorable financial factors to report, although I do not wish to create the impression that they have overcome the losses of income which I mentioned before, as they have not. We have initiated an Annual Giving Campaign. This did considerably better in the last year than the year before and, hopefully, will continue to increase with the passage of time. Likewise, the Pooled Life Income Fund has grown, and the total endowment has increased under the able management of our Finance Committee, chaired by Dr. Hodges. It is currently about $5.6 million. We have likewise been able to attract a considerable number of grants during the past two years. Notable among them are the most generous grants from the Glenmede Trust for the refurbishing of the Mütter Museum, and the grant from the William Penn Foundation which enabled us to install facsimile transmission equipment between our library and fourteen other medical school and hospital libraries in the surrounding area. We are all now able to transmit manuscripts or articles over a dedicated telephone line, both to and from our library and between these libraries in a matter of a few minutes, and thus greatly speed up the transfer of information from one spot to another. It is hoped that we can extend this system in the future, and we can thus better serve all the medical libraries in this area. I likewise hope that because of this system we may further advance cooperation between these and additional libraries in the future.

We should also like to acknowledge grants from the Greater Philadelphia Committee for Medical Pharmaceutical Sciences, the SmithKline Beckman Corporation, the Culpepper Foundation, the Merck Foundation, the Measey Foundation, the Pfahler Foundation, the Meyer Goldman Foundation, the Knight Foundation, the Wyomissing Foundation, the Butcher Family Foundation, the Rohrer Group, the Quaker Chemical Foundation, and the Arco Foundation. The aggregate value of all the grants was over $600,000. I must mention, however,

that these grants were all provided for specific program or project purposes, and therefore do not contribute to normal operating funding.

During this period the College also managed to exchange one of the houses which we owned on Twenty-first Street for another in the group of six, which are adjoining our parking lot. In addition, we bought a third house, so that we now have title to the three properties immediately adjacent to our parking lot. This puts the College in a far better position for future development in that area.

To mention some of the nonfinancial accomplishments during this period, the Planning and Development Committees were combined, and they have been active under the Chairmanship of our new President, Dr. Pressman. It is under their aegis that the study being carried out by Kepner/Tregoe, and financed by SmithKline Beckman Corporation, is focusing our plans for future development and will facilitate our move toward a major capital drive. The Planning and Development Committee likewise has started plans for the celebration of our 200th Anniversary, and the history of this College during the last 200 years is well into the process of being compiled and written by Dr. Whitfield Bell, a noted historian, who has been the executive officer of The American Philosophical Society.

During this period, we also obtained our own computer. Many of the College records are now maintained on our own computer, and we are now able to carry out many more activities than before in a fraction of the time.

Note should also be made of the new By-Laws that have resulted from the extensive work of Dr. Futcher and his committee, and which have brought our operational guidelines into line with current practices and policies.

During the last two years, The Wood Institute Steering Committee laid out a clear plan for this Institute, and subsequently, Dr. Diana Hall was selected as the new Director. She has brought new and vigorous leadership to the Institute, and we look forward with pleasure to a bright future and increasing activity in the historical activities of the College. A program on the Development of the American Hospitals is planned for this Fall and promises to be most interesting.

The film "Philadelphia Medicine—A Remarkable Journey," was produced under the aegis of Dr. Rosenau's committee, again with the financial backing of SmithKline Beckman Corporation, and has proved to be a very good pictorial history of the activities of this College. Like-

wise, during this time, a catalog of the art treasures of the College was assembled, under the very able leadership of Mrs. Julie Berkowitz, and financed by a great benefactor of this College, Dr. Arthur Dannenberg who, incidentally, was elected the first honorary member of Council in the history of this institution.

A new Section of the College was created last year, namely, the section on Geriatrics and Gerontology. This came about largely through the efforts and leadership of Dr. Joseph Freeman. This Section is off to a "flying start" and promises to be one of our most active and productive sections.

As always, the members of the Women's Committee have been tireless and productive in their work and we are greatly indebted to them for the rejuvenation of Thomson Hall, and for their book sales and various parties which they have held for the benefit of the College. One has only to compare the appearance of the various rooms in this building to what it was about ten years ago to see some evidence of the great results that have come from their continued efforts.

In summary, I believe this College must undertake a major capital drive in the near future if it is to retain the enviable position it has had in this city and country for the last 197 years. That this must and can be done I have little doubt, but it will require a major effort on the part of all of us. We have inherited a priceless treasure in this College, and we owe it to the following generations of physicians and others in the health sciences to maintain and nurture it. If this is done, it can continue to serve this area and our country as it has in the past.

In closing, let me again express my gratitude to the Fellowship for the honor of having served as your President during the last two years.

Annual Report of the Chairman of the Library Committee

PETER J. KOBLENZER

I WANT to summarize briefly the events at the library during the term of President Roberts and to outline some of the things that should lie ahead in the next few years.

Dr. Roberts' term of office was preceded by the appointment of a new director and assistant librarian. A new director of the Medical Documentation Service was appointed during his term, and it will end with the search for a new Curator of the Library's Historical Collections. Over this two-year period, the entire management staff of the library has been replaced. This probably will be seen as a watershed since it comes at a time of escalating change in information services. Twenty years from now our library certainly will be very different or it will exist only as a historical collection.

We are fortunate to have in Anthony Aguirre a young, highly qualified librarian who will help us enter the 21st century as a viable institution.

We have, in fact, two libraries: an invaluable historical collection and a thriving enterprise in the business of providing biomedical information to a variety of clients.

If our institution has any part at all to play in this age—if there is anything that makes us rare, if not unique, it is that we are the guardians of many of the artifacts of our honorable profession. Our books and other artifacts are that patrimony made visible, and it is a sacred trust to see that they are preserved—especially those items which relate to the establishment of our profession on these shores.

A historical library cannot stand still, and surprisingly little has been done in the past forty years to keep ours a going concern. The collection lacks focus and materials have been accepted indiscriminately, with little provision for cataloging and processing for permanence. They therefore remain inaccessible. The collection is at great risk of deterioration since until very recently climate control has been at best erratic. Few steps have been taken to combat acidity, and other

Presented before the Council of the College of Physicians of Philadelphia, June 26, 1984.

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measures necessary for optimal preservation have had to be neglected. A collection as large as ours merits a preservation laboratory, or at least ready access to one.

We have made no major acquisitions in many years. A hoped-for grant from the National Endowment for the Humanities requires a substantial investment in time before submission in order to prove that in fact we own the materials we wish to catalog with the grant.

The historical library can never be supported at its current level of activity, let alone at a desirable level, except through substantial endowment; and we must make it our business to ensure that these funds are found soon. In this endeavor we have a common interest with other institutions in Philadelphia. We might do well to explore the views of such august confreres as the American Philosophical Society, the Library Company, the Academy of Natural Sciences, the Historical Society of Pennsylvania and the Atheneum, all of whom have problems similar to ours. A subcommittee of the library committee specifically charged with the care and promotion of a historical collection might be a timely concept. The hiring of a new curator is, of course, our most urgent task and we can make no progress until he or she has assessed the situation and made plans for the developement of our historical collections.

A modern library presents a picture of fundamental change. Were we the same library of twenty or thirty years ago there would be no reason for us to exist. We are no longer the central resource for other medical school libraries. In 1983 we referred almost as many requests to them for materials not owned by the College as they sent to us. There are now at least two other libraries in the city (Jefferson and the University of Pennsylvania) that equal us in scope, and that have the additional advantage of a large in-house clientele.

Our unique advantage is that we are free-standing. This adds greatly to our burdens financially, but it also gives us great freedom to exert leadership and to pursue sources of revenue closed to some of the other institutions.

One hundred years ago we were the largest medical library in the U.S.A. Today we are 95th in new acquisitions, and 77th in salary expenditure (with the lowest per capita expenditure among Philadelphia medical school libraries), but first in revenue and third in interlibrary loan transactions—a remarkable feat attributable to the expertise and dedication of past and present library staff.

An important accomplishment of the past two years has been the activation of the Telefax network and, through CHINET (in collaboration with the University of Pennsylvania Biomedical Library), the establishment of a base for consumer-oriented health information. These will allow us to pursue one of our principal aims during the next two years, namely, greater rapprochement between major biomedical libraries in our area.

We have also encouraged the director to eliminate subscriptions to journals which through lack of use appear to have become redundant, or are little used and are easily available elsewhere, and to substitute titles in more demand by our users. We have also encouraged the director to expand the client base for the library, particularly with the pharmaceutical and legal professions.

We are greatly heartened by the apparent turn-around in fortunes of the Medical Documentation Service which now turns a modest profit that is applied to other library operations. In time it could possibly bring the whole library into a break-even situation if the library continues its modest spending practice. The director, however, feels that the investment in library automation, the pursuit of salary equity and, most importantly, the restoration of both current and historical collections to the position of pre-eminence they once enjoyed cannot be held hostage to increased income from fee-based library operations. An institutional commitment and action to raise endowment is necessary if the library is to regain and hold its reputation as one of the great American book centers.

We are entering a world which even ten years ago was inconceivable. Sears-Roebuck hopes to enter the medical market place and by the end of the century may capture 10% of the ambulant-care dollar. If this startling concept can materialize in that short space of time (and Sears-Roebuck will surely be followed by others), it will be difficult to predict consumer needs in biomedical information twenty years hence. We must be in the forefront of that field, but we must also come to terms with the fact that this, too, might be taken over by "Big Business."

It is not my place to advise Council, but I emphatically suggest that it behoves us to make the increase our endowment for all the library's needs one of our major efforts.

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1984–1986

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Meeting Schedule: Fourth Tuesday, 4:00 P.M.

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George P. Rosemond, M.D.

Meeting Schedule: At Call of Chairman

Committee on Budget & Finance
Daniel L. Shaw, Jr., M.D., *Chairman*

Mark W. Allam, V.M.D.
Lewis L. Coriell, M.D.
Arthur M. Dannenberg, M.D.
John R. Durant, M.D.
Herbert A. Faust, M.D.
Marshall B. Guthrie, Jr., M.D.
John H. Hodges, M.D.
Calvin F. Kay, M.D.
Paul Nemir, Jr., M.D.
John R. Park
Jonathan E. Rhoads, M.D.
George P. Rosemond, M.D.
Peter A. Theodos, M.D.
Roderick Tondreau, M.D.
Henry J. Tumen, M.D.
J. Edwin Wood, III, M.D.

Meeting Schedule: Third Wednesday, 1:00 P.M.

Committee on By-Laws & Ordinances
Palmer H. Futcher, M.D., *Chairman*

Frank P. Brooks, M.D.
Edward S. Cooper, M.D.
Robert J. Gill, M.D.
Karl F. Rugart, M.D.

Meeting Schedule: At Call of Chairman

Committee on Continuing Education
Edward J. Stemmler, M.D., *Chairman*

Barbara J. Andrew, Ph.D.
John R. Beljan, M.D.
Frederic D. Berg, M.D.
Theodore J. Berry, M.D.
Robert W. England, D.O.
Gerald H. Escovitz, M.D.
Albert J. Finestone, M.D.
Paul J. Fink, M.D.
June F. Klinghoffer, M.D.
Wallace G. McCune, M.D.
Paul M. Roediger, M.D.
Edward C. Rosenow, Jr., M.D.
Patrick B. Storey, M.D.
Victor C. Vaughn, III, M.D.

Meeting Schedule: At Call of Chairman

Committee on Publications (Editorial Committee)
Robert Austrian, M.D., *Chairman*

Whitfield J. Bell, Jr., Ph.D.
George Ross Fisher, M.D.
John L. McClenahan, M.D.
Charles E. Rosenberg, Ph.D.
Jane M. Oppenheimer, Ph.D.
Jonathan E. Rhoads, M.D.
Fred B. Rogers, M.D.

Meeting Schedule: At Call of Chairman

Committee on Fellowship
Joseph A. Wagner, M.D., *Chairman*

Herman Beerman, M.D.
Adolph H. Bleier, M.D.
Robert V. Cohen, M.D.
Robert W. England, D.O.
William I. Heine, M.D.
Horace MacVaugh, III, M.D.
Karl R. Meyers, M.D.
Timothy J. Michaels, M.D.
Edward J. Resnick, M.D.
Brooke Roberts, M.D.
George P. Rosemond, M.D.
Linwood F. Tice, D.Sc.
Robert C. Wolfe, M.D.
Margaret G. Wood, M.D.
Matthew J. Zakreski, M.D.

Meeting Schedule: Second Tuesday, 3:30 P.M.

Committee for the Francis Clark Wood Institute
Stewart G. Wolf, Jr., M.D., *Chairman*

Robert Austrian, M.D.
Harold D. Barnshaw, M.D.
Doris G. Bartuska, M.D.
Whitfield Bell, Jr., Ph.D.
Lewis L. Coriell, M.D.
Palmer H. Futcher, M.D.
John P. Hubbard, M.D.
Steven J. Peitzman, M.D.
Samuel X. Radbill, M.D.
Jonathan E. Rhoads, M.D.
Vaughn P. Simmons, M.D.
Stephen H. Sinclair, M.D.
Rosemary Stevens, Ph.D.
Frederick B. Wagner, Jr., M.D.
Mrs. Charles C. Wolferth, Jr.
Richard W. Foster
Fred B. Rogers, M.D.
Francis C. Wood, M.D.

Meeting Schedule: Fourth Tuesday, Odd Months, 10:30 A.M.

Hall and Grounds Committee
Norman Makous, M.D., *Chairman*

John T. Deininger, M.D.
Peter J. Devine, M.D.
Darwin W. Ferguson, M.D.
William G. Figueroa, M.D.
Sidney O. Krasnoff, M.D.
Marc Lapyowker, M.D.
Steven J. Peitzman, M.D.
Robert E. Weibel, M.D.
Charles C. Wolferth, Jr., M.D.

Meeting Schedule: Third Friday, Odd Months, 1:00 P.M.

Library Committee
Peter Koblenzer, M.D., *Chairman*

Robert Austrian, M.D.
Herman Beerman, M.D.
Patricia Borns, M.D.
Solomon S. Brav, M.D.
Maurice L. Clancy (A)
Joseph T. Freeman, M.D.
Palmer H. Futcher, M.D.
Robert E. Jones, M.D.
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Philip B. Kimbel, M.D.
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Samuel X. Radbill, M.D.
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Mrs. Brooke Roberts
George P. Rosemond, M.D.
Alvin M. Soffe, M.D.
Earle H. Spaulding, Ph.D.
Stewart G. Wolf, Jr., M.D.

Meeting Schedule: Fourth Thursday, 4:00 P.M.

Rare Books Sub-Committee
Irwin J. Pincus, M.D., *Chairman*

Joseph T. Freeman, M.D.
Peter Koblenzer, M.D. (Ex-Officio)
Samuel X. Radbill, M.D.

Meeting Schedule: At Call of Chairman

Committee on the Mütter Museum and College Collections
Robert H. Bradley, Jr., M.D., *Chairman*

Henry Abrams, M.D.
Mrs. Herman Beerman
Bernard Behrend, M.D.
Robert T. Boyd, III, M.D.
Warner D. Bundens, M.D.
Lewis L. Coriell,, M.D.
C. Nelson Davis, M.D.
Henry Drinker, M.D.
Horatio T. Enterline, M.D.
Mary S. Fisher, M.D.
Edwin J. Foltz (A)
Walter P. Lomax, M.D.
Alma Dea Morani, M.D.
Mrs. Frank T. Mansure
Perry Ottenberg, M.D.
Lawrence C. Parish, M.D.
Mrs. Robert S. Pressman
Thomas K. Rathmell, M.D.
Howard H. Steel, M.D.

Meeting Schedule: Second Wednesday, 4:00 P.M.

Committee on Planning and Development
Lewis L. Coriell, M.D., *Chairman*

George I. Blumstein, M.D.
Lewis W. Bluemle, Jr., M.D.
Herbert A. Faust, M.D.
John H. Hodges, M.D.
Arthur C. Kaufmann
Brooke Roberts, M.D.
Jonathan E. Rhoads, M.D.
George P. Rosemond, M.D.
Daniel L. Shaw, Jr., M.D.
George L. Spaeth, M.D.

Meeting Schedule: First Tuesday, 4:00 P.M.

Committee on Public Health and Preventive Medicine
Paul D. Stolley, M.D., Chairman

C. Nelson Davis, M.D.
Georgina Faludi,, M.D.
Ira W. Gabrielson, M.D.
Richard A. Lippin, M.D.
Walter P. Lomax, M.D.
Samuel P. Martin, III, M.D.
Thomas K. McElhinney, Ph.D.
Lewis W. Polk, M.D.
Raymond Q. Seyler, M.D.
Stuart Shapiro, M.D.
Robert Sharrar, M.D.
John Sorenson, Th.M.
Rosemary Stevens, M.D.

Meeting Schedule: Third Thursday, Even Months, 3:30 P.M.

Committee on Scientific Affairs
George L. Spaeth, M.D., *Chairman*

Doris G. Bartuska, M.D.
Baruch S. Blumberg, M.D.
Mary S. Fisher, M.D.
Joseph S. Gonnella, M.D.
C. William Hanson, Jr., M.D.
Wallace G. McCune, M.D.
William N. Mebane, III, M.D.
Mrs. F. Douglas Raymond, Jr.
Edward J. Stemmler, M.D.

Meeting Schedule: At Call of Chairman

Women's Committee
Mrs. C. William Hanson, Jr., *Chairwoman*

Mrs. Robert S. Pressman, *Vice Chairwoman*
Mrs. Keith Fischer, *Recording Secretary*
Mrs. John Webber, *Treasurer*
Mrs. Paul Nemir, Jr., *Corresponding Secretary*

Meeting Schedule: First Tuesday, 10:00 A.M.

Sections of the College of Physicians of Philadelphia

Section on Allergy

Herbert Mannsman, Jr., M.D., Chairman — Eliot H. Dunsky, M.D., Clerk

Section on Dermatology

Lawrence C. Parish, M.D., Chairman — Joseph A. Witkowski, M.D., Clerk

September 14, 1983
Pemphigoid—An Approach to Diagnosis and Treatment
Joseph W. Burnett, M.D.

January 25, 1984
Diagnosis and Therapy of Pigmenting Disturbances
John A. Kenney, M.D.

March 7, 1984
A Dermatological Potpourri 1943–83
George W. Hambrick, Jr., M.D.

May 2, 1984
One Academician's View of the Future of Dermatology with Special Reference to—Physician Oversupply, DRG's, Competition and the Emergence of New Relationships in Health Care.
Gerald S. Lazarus, M.D.

September 12, 1984
Recent Advances in the Management of Superficial Fungal Infections.
Edgar Ben Smith, M.D.

November 28, 1984
An Evening with Dermatologists from Around the World.
Mohamed Amer, M.D., Zagazig, Egypt
Lucio Andreassi, M.D., Siena, Italy
Francisco Kerdel-Vegas, M.D., Caracas, Venezuela
Charles M. Lapiere, M.D., Liege, Belgium
Antar Padilha-Goncalvez, M.D., Rio de Janiero, Brazil
Emiliano Panconesi, M.D., Firenza, Italy
Albin Proppe, M.D., Kiel, West Germany
Sebastiano Sampaio, M.D., Sao Paulo, Brazil
Hening Schmidt, M.D., Odense, Denmark

Section on Ophthalmology

Myron Yanoff, M.D., Chairman — Guy Chan, M.D., Clerk

1983–94 Program
George Edmund de Schweinitz Lecture and Dinner
Edmund Spaeth Lecture and Dinner (co-sponsor with Ophthalmic Club)

Old Blockley Section

C. Nelson Davis, M.D., Chairman — Miriam B. Dahlke, M.D., Scribe

Section on Gerontology

Joseph T. Freeman, M.D., Chairman — Patrick B. Storey, M.D., Clerk

Section on Basic Sciences

Kenneth R. Cundy, Ph.D., Chairman — Carl Alper, Ph.D., Clerk

Section on Insurance Medicine

Joseph D. McGeary, M.D., Chairman — Millard S. Leute, M.D., Clerk

Section on Medical History

Steven J. Peitzman, M.D., Chairman

Michael Zimmerman, M.D., Clerk

Section on Otolaryngology

William H. Baltzell, M.D., Chairman

Emil Liebman, M.D., Clerk

Fellows Elected in 1984

Angelo S. Agro, M.D.	2/84
Howard Y. Ando, Ph.D.	12/84
Demetrius H. Bagley, M.D.	6/84
Dorothy M. Barbo, M.D.	12/84
Steven J. Barrer, M.D.	12/84
Edward H. Bedrossian, Jr., M.D.	9/84
John R. Beljan, M.D.	10/84
Randal R. Betz, M.D.	4/84
Ernst H. Beutner, Ph.D.	2/84
Maurizio Binazzi, M.D.	11/84
Hugh Bonner, M.D.	10/84
Susan H. Bray, M.D.	4/84
Charles B. Brill, M.D.	3/84
Harry D. Carrozza, M.D.	12/84
Arthur Chernoff, M.D.	12/84
Herbert Elliot Cohen, M.D.	9/84
George S. Constantinopolous, M.D.	9/84
Steven P. Cook, M.D.	3/84
L. Andre Corman, M.D.	3/84
Daniel F. Cowan, M.D.	12/84
Ronald P. Daniele, M.D.	10/84
Barbara F. Danoff, M.D.	10/84
Gary R. Diamond, M.D.	11/84
Charles Dick, M.D.	11/84
John H. Ebenshade, M.D.	10/84
Solomon Epstein, M.B., Ch.B.	12/84
Manucher Fallah Nejad, M.D.	10/84
Elizabeth Lobuv Feussner, V.M.D.	12/84
James W. Feussner, M.D.	12/84
Newell Fischer, M.D.	2/84
Ruth S. Fischer, M.D.	2/84
Richard E. Gibbons, M.D.	11/84
William J. Gilhool, D.O.	10/84
Milton S. Good, M.D.	6/84
Gad Guttman, M.D.	12/84
Walter C. Hargrove, M.D.	10/84
Gerald J. Herbison, M.D.	10/84
H. Dunbar Hoskins, Jr., M.D.	4/84
Eric L. Hume	4/84
David A. Iddenden, M.D.	10/84
Laird G. Jackson, M.D.	10/84
Leonard S. Jacob, M.D., Ph.D.	4/84
Bernett L. Johnson, Jr., M.D.	10/84

Peter R. Kowey, M.D.	10/84
Laurence J. Krenis, M.D.	12/84
Albert S. Kroser, D.O.	6/84
Lila Stein Kroser, M.D.	6/84
Theodore Krupin, M.D.	2/84
Robert J. Laskowski, M.D.	6/84
Francis C. Lazorik, M.D.	11/84
Michael H. Lewitt, M.D.	6/84
Michael L. Lippmann, M.D.	6/84
Robert P. Lisak, M.D.	10/84
Virginia A. LiVolsi, M.D.	10/84
Carl M. Mansfield, M.D.	10/84
Peter R. McCombs, M.D.	12/84
William L. Medford, Jr., M.D.	2/84
Geno J. Merli, M.D.	10/84
Timothy J. Michals, M.D.	3/84
Allen Misher, Ph.D.	6/84
Philip J. Moldofsky, M.D.	11/84
Peter C. Nowell, M.D.	10/84
Donald Oken, M.D.	4/84
Emiliano Panconesi, M.D.	12/84
David E. Pleasure, M.D.	10/84
Louis J. Riley, Jr., M.D.	12/84
Wallace P. Ritchie, Jr., M.D., Ph.D.	9/84
John L. Rombeau, M.D.	10/84
Jerome Santoro, M.D.	10/84
Scott H. Saul, M.D.	10/84
Philip S. Schein, M.D.	4/84
Donald L. Schotland, M.D.	10/84
Joseph E. Scogna, M.D., Ph.D	10/84
Marvin L. Sears, M.D.	2/84
Joseph L. Seltzer, M.D.	12/84
Michael E. Selzer, M.D., Ph.D.	10/84
Nadia Shapira, M.D.	3/84
Seymour Siegel, M.D.	9/84
Richard J. Simmons, M.D.	3/84
David G. Smith, M.D.	4/84
Joseph M. Stowell, M.D.	10/84
J. Wayne Streilein, M.D.	6/84
Gunter B. Stuttgen, M.D.	10/84
Austin J. Sumner, M.D.	10/84
Edward H. Sweeney, D.M.D.	9/84
Richard J. Wechsler, M.D.	6/84
Ralph F. Wetmore, M.D.	12/84
Peter C. Whybrow, M.B., B.S.	10/84
Richard P. Wilson, M.D.	2/84
Daniel Lee Wiseley, D.O.	4/84

Deceased Fellows—1984

	Year Elected	Date of Death
John T. Bauer, M.D.	1933	1/84
Herman T. Boerner, M.D.	1902	9/84
John B. Carson, M.D.	1917	4/84
Richard T. Cathcart, M.D.	1954	9/84
John Cheleden, M.D.	1941	1/84
Clarence Crafoord, M.D.	1973	3/84
John H. Foulger, M.D.	1960	10/84
Richard W. Garlichs, M.D.	1951	10/84
Vaughn C. Garner, M.D.	1931	11/83
Glen Gregory Gibson, M.D.	1939	10/84
Clyde H. Kelchner, M.D.	1947	1/84
John F. Kustrup, M.D.	1964	10/84
Milo Leavitt, M.D.	1975	1/84
Leah Lowenstein, M.D., Ph.D.	1983	3/84
Lowrain McCrea, M.D.	1938	1/84
Malcom W. Miller, M.D.	1939	10/84
Craig W. Muckle, M.D.	1941	10/84
Charles Rankin, M.D.	1942	1/84
Hilton S. Read, M.D.	1939	1/84
Joseph A. Splendido, M.D.	1958	6/84
Marion Sulzberger, M.D.	1981	11/83
Daniel B. Taylor, M.D.	1961	1/84
Robert H. Trueman, M.D.	1947	3/84
H. Curtis Wood, M.D.	1944	6/84

ACADEMIA

Items of Interest from Philadelphia Medical Centers

Thomas Jefferson University. *Paul A. Bowers, M.D.* has been elected alumni trustee. Dr. Bowers' is emeritus professor of obstetrics and gynecology at Jefferson Medical College.

Robert S. Backlow, M.D., former Associate Chairman and Professor of Internal Medicine at Rush Medical College, has been appointed Senior Associate Dean.

Children's Hospital of Philadelphia. Under the direction of *George J. Peckham, M.D.* director of the division of Neonatology, the hospital will collaborate with Pennsylvania Hospital and the Hospital of the University of Pennsylvania in a research program to study the long term health outcome of low birthweight babies. Work will be carried out under a grant from the Robert Wood Johnson Foundation.

Peter Berman, M.D. has been elected president of the Association of Professors of the Child Neurology Society.

The Children's Seashore House in Atlantic City has appointed *David R. Levy* its clinical director.

The Medical College of Pennsylvania. Under the supervision of *Janet Parker, M.D.,* professor of Radiology, an interactive video disc system will permit students to review basic material in the radiology curriculum. The computerized device permits a student to examine a visual image on a screen and to judge his response.

The Service Award of the Family Planning Council of Southeastern Pennsylvania has been given to *Mary O. Gabrielson, M.D.,* director of the Obstetrics/Gynecology Ambulatory Service.

A series of six conferences for resident physicians and nurses, funded by the James Picker Foundation, will examine ethical issues in patient care.

Troubled youngsters aged six to thirteen will simultaneously attend school and receive therapy at a school affiliated with the Eastern Pennsylvania Psychiatric Institute. *David Behar, M.D.* is acting chief of this Partial Hospitalization Program.

Pekka A. Mooar, M.D. and *Ellen C. Maitin, M.D.,* assistant professors of orthopedics, have been appointed chiefs of the sections of sports medicine/traumatology and of hand surgery respectively.

The efficacy of drug therapy and psychosocial management of schizophrenia will be the subject of a joint research program with the Eastern Pennsylvania Psychiatric Institute. Funded by the National Institute of Mental Health, the program will be directed by *Alan S. Bellack, Ph.D.* and *George M. Simpson, M.D.*

Philadelphia College of Osteopathic Medicine. *J. Peter Tilley, D.O.* has been elected president of Philadelphia College of Osteopathic Medicine. Dr. Tilley is a radiologist with dual certification in nuclear medicine.

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MEDICINE & HISTORY

Series V Volume VII No 2 June 1985

TRANSACTIONS & STUDIES

of

THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA

MEDICINE & HISTORY

Series V Volume VII N° 2 June 1985

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ISSN 0010–1087

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* * *

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TRANSACTIONS AND STUDIES
OF THE
COLLEGE OF PHYSICIANS OF PHILADELPHIA

Series V Volume VII Number 2 June 1985

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Cushing and Osler: The Evolution of a Friendship

JEREMIAH A. BARONDESS

SUMMARY: William Osler and Harvey Cushing developed and sustained a friendship of great closeness for twenty-three years, beginning with Cushing's arrival for his surgical training in Baltimore, and ending with Osler's death. They were remarkably similar in their approaches to clinical medicine and in their passionate interests in medical bibliophilia and history. Cushing's identification with Osler was such that, at least in many of the activities and writings of his later years, he represented in effect an extension of Osler's presence.

WILLIAM OSLER died on December 29, 1919. A month later, Harvey Cushing wrote a touching obituary-memoir, warm, reminiscent and thoughtful, touching on some of the facets of their twenty-three-year friendship that, for him, defined much of its flavor and richness, and the particular intensity it held for him. He wrote:

> Beginning with the kindly admonition (i.e. not to neglect to mention juniors connected with recorded cases) when I was a young surgical house officer at the J.H.H. first trying my feeble literary wings, through letters to a few days before his death—these I find among my papers . . . It was Revere's death unquestionably that so undermined his health he was an easy prey to his terminal pneumonia. The note from Jersey on the 2nd anniversary of the boy's death addressed to 'Dr. Harvey' shows how great was his concealed emotion even then. There are other letters . . . . but the extent to which the man influenced my own life as he did that of all others with whom he came in contact is shown by the notes and clippings and pictures which occur in all my books and papers. I had entirely forgotten the Baltimore scrap book until I began to look over the accumulation. In it we found data concerning the Ship of Fools book club—The John Locke dinner—our presentation to him of the Dictionary of National Biography—the slip recalling Revere's annual celebration of Guy Fawkes' day—the notes from his textbook describing the writing thereof—The Fixed Period address and something of the extraordinary reaction to it in the press which gave us so much anxiety and distress and which sent him to Oxford with a sorry heart I am sure.
>
> . . . . Meanwhile K. C. unearthed many old Kodak pictures among her things which were pasted in her "Willie book" and my journalettes—all contained much about him and 13 Norham Gardens and Lady Osler. When they left Baltimore many of the household possessions were scattered among the "latch keyers" as we were called for a lot of us were given keys and came and went at 1 West Franklin Street as though it were our house—and it

Presented as the Presidential Address, American Osler Society, Atlanta, April 27, 1984, and as the Annual Lecture, Associates of the Yale Medical Library, New Haven, May 18, 1984. *Dr. Barondess is Professor of Internal Medicine, Department of Medicine, Cornell University Medical College.*

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> was . . . The last thing taken from the house was the door plate which Lady Osler told me to unscrew and keep the morning she departed and which I have had mounted on a block of the Virginia Sandstone from which the house was built . . . There are innumerable things on Dr. Osler's trail that will continue to crop up for many years to come. One thing that I have seen no reference to in the many recent notices is the secret early history of the J.H.H. which is under lock and key to be opened in 100 years. It is probably an amusing skit on the early days. I once saw the book and he read a note from it about Halsted's courting of Miss Hampton."[1]

One should perhaps not find it surprising that these two men developed a friendship of such complexity and warmth, despite the differences in age and status when they first came to know one another, for, in fact, they held common values and interests of immense

FIGURE 1. Osler's doorplate from 1 West Franklin Street, Baltimore. From the collections of the Historical Library, Yale Medical Library.

importance that bound them to each other, quite possibly each as the best friend the other ever had. Their friendship, like most that are strong and lasting, was one in which each found in the other powerful echoes of his own background and interests; echoes, that is, of himself. Each came from a large family and had numerous older siblings. Each was raised in an atmosphere that emphasized traditional

virtues, especially hard work, the clear need to make one's own way, and thrift, virtues emphasized by strong parental role models. Each was high-spirited in boyhood and youth, but found opportunities at home to consort, through books, with the world of ideas and to explore history as a vista evoking feelings of personal identification. Each made a strong marriage that facilitated and supported a life of accomplishment.

But why it should have happened as it did that the young surgical house officer and the Professor of Medicine established the beginnings of such a long and fruitful closeness, is a matter of some interest, a reflection in part of the powerful orientation toward young colleagues held by Osler, and of the charismatic effect he had on his juniors.

Cushing was twenty-seven years old when, in 1896, he came to Baltimore as William Halsted's Assistant Resident in Surgery. Born in Cleveland, he had been to Yale and to the Harvard Medical School, and had spent sixteen months as "House Pupil" at The Massachusetts General Hospital. He had had a wonderful time as a Yale undergraduate, achieving election to Scroll and Key (a matter of considerable importance

FIGURE 2. Yale freshman baseball team, 1888. Cushing is in front row, center. From the collections of the Historical Library, Yale Medical Library.

to him despite his father's vigorous injunctions against drinking, smoking, and consorting with those of easy virtue) and, above all, engaging in inter-collegiate athletics and securing also the short-stop position on the Yale baseball team.

At the Harvard Medical School (M.D. *cum laude* 1895), his drive and brilliance were recognized by his classmates and his gift of originality was already apparent. Thus, during his student years he and his classmate, Amory Codman, developed a system for recording the pulse and respiratory rates of the anesthetized patient as a guide to the surgeon and the anesthetist; these "ether charts", as they were called, were introduced in 1895 (when Cushing was a fourth year student, twenty-five years of age) and were the forerunner of modern operating room records.[2]

During his post-graduate year at The Massachusetts General he was instrumental in purchasing an X-ray tube for the hospital within a year

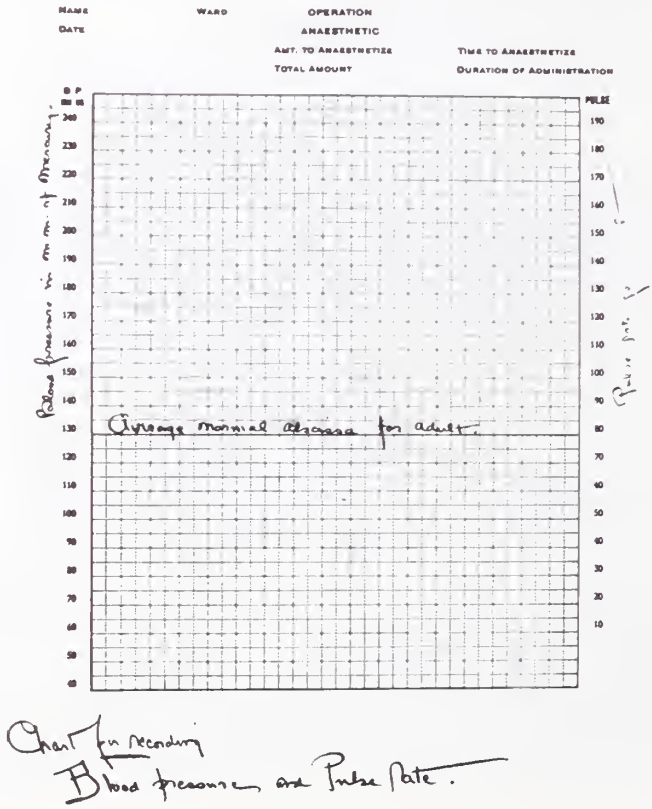


FIGURE 3. Operating room pulse and blood pressure chart. Marginal notes in Cushing's handwriting. From the collections of the Historical Library, Yale Medical Library.

of the announcement of Roentgen's discovery. He brought the tube with him to Baltimore the following year, took the first radiographs at The Johns Hopkins Hospital, and, in 1897 and 1898 published two case reports involving the use of X rays.[3, 4]

And so, in the fall of 1896, this energetic, attractive and promising young man arrived in Baltimore, filled with ambition, clearly talented, already contributing improvements in clinical care, and destined for a life of high accomplishment. Osler at this time was forty-seven years of age, and had been in his Johns Hopkins professorship for eight years. His renown was already considerable, in fact international; he was the leading American figure in internal medicine and his clinic and textbook were dominant in their fields.

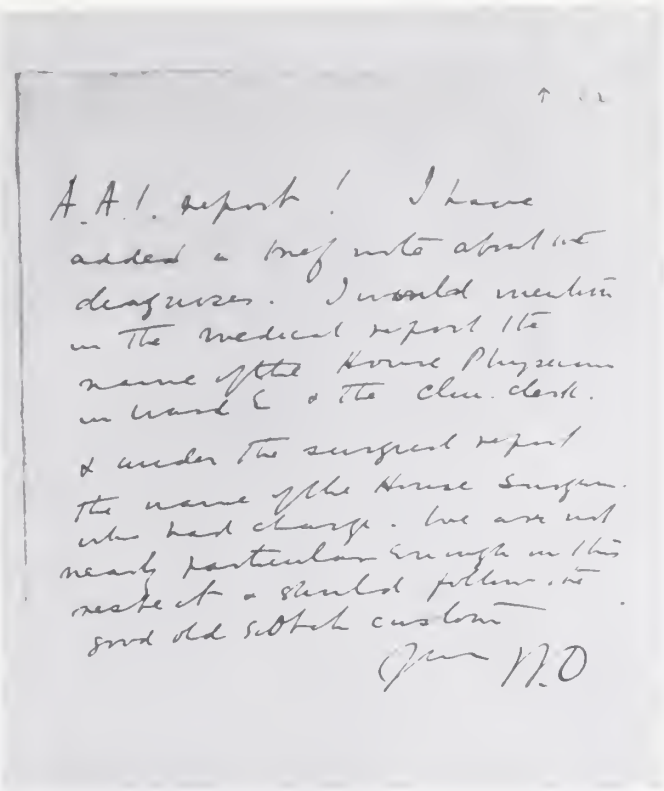
Details of Cushing's contacts with Osler during his early years at Hopkins are sparse, though the small size of the staff and the intense activity that characterized the new institution, including the vigorous young Johns Hopkins Medical Society and the Johns Hopkins Historical Club, must certainly have brought them together frequently. Fulton noted that during Cushing's first two years in Baltimore Osler's influence on him had already become apparent in his (Cushing's) "newly developed interest in books, bookplates, and the acquisition of a library,"[5] interests encouraged by his father. In 1897 Cushing developed appendicitis. Having made the diagnosis and written the admission history himself, he was seen in consultation by Osler before Halsted operated. During his convalescence he designed a family bookplate which included initialed references to the other Doctors Cushing: David (his great-grandfather), Erastus (his grandfather), Henry Kirke (his father), Edward Fitch ("Ned"—his brother), "H.C." himself and, later, Kirke and Edward Harvey (nephews), together with the years of their medical degrees.

Early clinical associations with Osler included a case of Banti's Syndrome in which Osler made the diagnosis and recommended splenectomy, which was carried out by Cushing. In addition, he became involved in the Hopkins effort to help with the numerous cases of typhoid fever among U.S. soldiers fighting in the Spanish-American War. He operated upon a number with intestinal perforations, and published two papers on the subject in *The Johns Hopkins Hospital Bulletin* in 1898[6] and *The Johns Hopkins Hospital Reports* in 1900.[7] The first of these brought a note of commendation from Osler and the "kindly admonition" mentioned in the obituary-memoir quoted above. In 1899, two years

FIGURE 4. Cushing's bookplate. From the collections of the Historical Library, Yale Medical Library.

after his arrival in Baltimore, he introduced his intended, Kate Crowell, of Cleveland, to the Oslers, a clear indication that a close personal relationship already existed with them.

By 1900 Cushing had spent four years at Johns Hopkins, first as Assistant Resident and then as Resident Surgeon, under Halsted. He had become a highly accomplished general surgeon and, in fact, was already a central figure in the Hopkins department. His publications (numbering at this time ten papers), and especially his work on typhoid, had brought him wide recognition, and in 1899 an invitation to join The Department of Surgery at Western Reserve University in Cleveland. Although tempted, he elected to remain in Baltimore. Now, at the age of thirty, committed to an academic surgical career, and with the encouragement of his father and of Osler and Welch, he spent fourteen months in Europe—an experience which transformed him from ". . . a self-assured and somewhat provincial young American with many a deep-rooted prejudice . . .." into ". . . a cosmopolitan with a greatly broadened point of view on medical matters, and a deep respect for European culture and tradition."[8]



A.A.1. report! I have added a brief note about the diagnoses. I would mention in the medical report the name of the House Physician in Ward E & the clin. clerk. & under the surgical report the name of the House Surgeon who had charge. We are not nearly particular enough in this respect & should follow the good old Scotch custom.

Yours W.O.

FIGURE 5. Note from Osler to Cushing, 1898:
"A.A.1. report! I have added a brief note about the diagnoses. I would mention in the medical report the name of the House Physician in Ward E and the clin. clerk and under the surgical report the name of the House Surgeon who had charge. We are not nearly particular enough in this respect and should follow the good old Scotch custom. Yours W.O. From the collections of the Historical Library, Yale Medical Library.

This year of travel was planned around study with Kocher, Horsley and Sherrington, all men with neurological interests, although Cushing remarked twenty years later that at the time he had no idea of ultimately specializing in neurological surgery.[9] He arrived in Liverpool in July, 1900, and was welcomed by Osler, who was spending the summer in England "braindusting." Through Osler's sponsorship he met many of the leading British medical men of the day, and was included in social and professional gatherings to which he would not otherwise have had access. The Oslers included him also in their own activities; lunch at the George and Dragon at Wargrave, rowing on the Thames, a visit to Dorset to escape the sweltering London heat, and through it all, visits to

FIGURE 6. Mrs. Osler and Revere, Cushing behind, on the Thames, 1900. From the collections of the Historical Library, Yale Medical Library.

the great London clinics and, over and over again, to the Hunterian Museum at the Royal College of Surgeons. He examined old books with Rolleston, visited the portraits at the College of Physicians and saw the Gold-Headed Cane. He met Jonathan Hutchinson, Horsley, Broadbent and Gowers, and attended the centennial celebration of the Royal College of Surgeons. Thus, the month in England saw his interests broadened, his contacts with medical men of great accomplishment enriched, and his nascent bibliophilia and historical interests beginning to stir, all under the beneficent guidance and stimulus of Osler, who had clearly marked him for special attention.

After the London sojourn Cushing toured France and Switzerland, particularly sites of medical interest. In the process he put into a travel

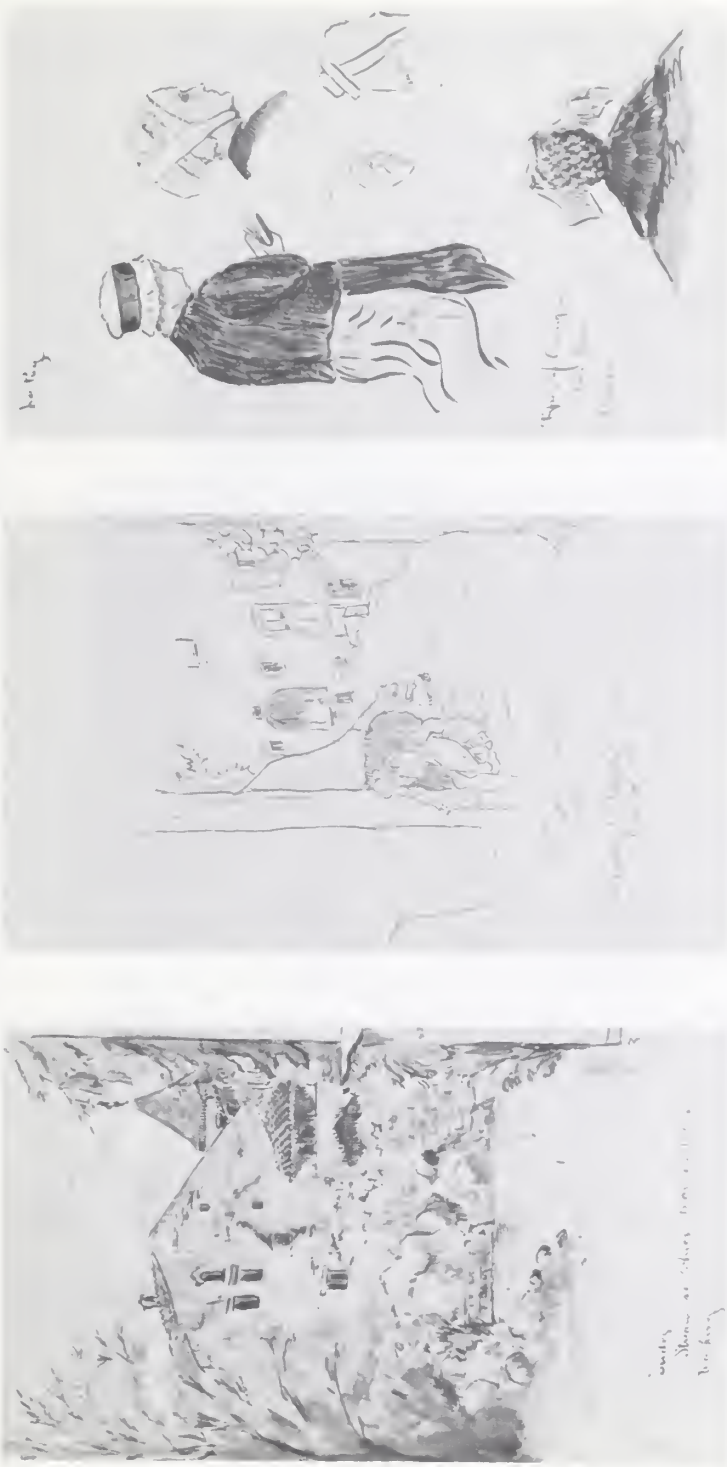


FIGURE 7. Sketches and water colors, Le Puy-en-Velay, 1900. From the collections of the Historical Library, Yale Medical Library.

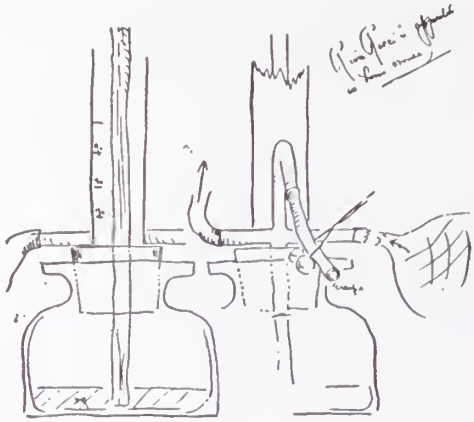
diary notes and a series of beautiful sketches and water colors of LePuy-en-Velay, which give vivid evidence of his capacity for artistic expression and keen observation. Ultimately, in Kronecker's laboratory in Berne, with the requisite blessing from Kocher, Halsted's great friend, he conducted a brilliant series of studies on the effects of increased intracranial pressure on blood pressure and intracranial blood flow. These experiments demonstrated the rise in arterial pressure that accompanies increasing intracranial pressure, and the lethality of intracranial pressures in excess of the arterial level. In other studies he analyzed the effect of saline solutions on frog nerve-muscle preparations. Within four months he not only accumulated a body of highly

FIGURE 8. On the ice with Hugo Kronecker, 1901. From the collections of the Historical Library, Yale Medical Library.

FIGURE 9. Post card showing two of the della Robbia medallions at the Hospital of the Innocents, Florence. From Cushing's travel diary, 1901. The notes, in Cushing's hand say: "Various stages of swaddling and unswaddling. The blue background of these figures is absolutely the color of the Florentine sky of April." From the collections of the Historical Library, Yale Medical Library.

important data, but found himself included in the social circle of the Berne medical establishment, at least in part, according to Leon Asher, his physiologist friend, because of "his personality and his beautiful dancing."[10] He also grew a moustache which made him look astonishingly like the young Osler!

The trip continued through Italy, where, studying humans with bony defects of the skull in Angelo Mosso's laboratory, he made important additional observations on the relation between systemic arterial pressure and pressure on the vasomotor center. In Florence he was greatly taken with della Robbia's medallions at the Hospital of the Innocents, and in Padua, intellectual seat of Malpighi, Vesalius, Fabricius and Harvey, his historical perceptions were further stimulated and sharpened. At Pavia, in the Ospedale di S. Matteo, he found an



CUSHING'S DIAGRAM OF RIVA-ROCCI'S APPARATUS
FOR DETERMINING BLOOD PRESSURE
From *Diary*, 6 May 1901

FIGURE 10. From the Alan Mason Chesney Medical Archives, The Johns Hopkins Medical Institutions.

adaptation of Riva Rocci's blood pressure apparatus in clinical use, sketched it and brought back to Baltimore a model of the inflatable armlet. Thus, he was instrumental in introducing clinical sphygmomanometry into use in the operating rooms and clinics in this country.[11] He continued through Germany, meeting or visiting with Naunyn, Hofmeister, Erb, Kussmaul, Solley and other greats. The trip ended with a fruitful month with Sherrington working on cerebral localization in the chimpanzee, orangutan and gorilla, a forerunner not only of much of Cushing's future work, but of his warm lifelong friendship with Sherrington. Later he visited William Hunter's remarkable museum and great library, an event that Fulton suggested might have crystallized in his mind the idea of forming a library of his own.[12]

The trip over, now acquainted with the wider world of medicine, and with a record of substantial accomplishment in several of the great European laboratories, he returned to Baltimore. The degree to which his experiences in Britain and on the continent were orchestrated or at least facilitated by Osler is unclear, but must have been substantial. In addition, this trip clearly marked the beginning of real intimacy between Cushing and the Oslers. Back at Hopkins he was invited to join the faculty, due, he wrote, "largely . . . to pressure brought to bear by Welch and Osler."[13]

As the friendship grew, so did Osler's influence on Cushing. Fulton felt that the younger man tried to emulate Osler's outgoing personality, as his own relationships with colleagues and subordinates were often difficult.[14] Early in 1902 Osler warned him of the danger of this, further evidence of his concern for the development of Cushing's career:

3/3/02

1 West Franklin St.

". . . you will not mind a reference to one point—the statement is current that you do not get on well with your surgical subordinates and colleagues. I heard of it last year and it was referred to by a strong admirer of yours in New York. The statement also is made that you've criticized before the students the modes of dressings, operations, etc., of members of the staff. This, I need scarcely say, would be absolutely fatal to your success here. The arrangement of the Hospital staff is so peculiar that loyalty to each other, even in the minutest particulars, is an essential. I know you will not mind this from me, and have your interest at heart.

Sincerely yours,
Wm Osler

and, a few days later:

1 West Franklin St

Dear C—Do nothing of the kind! Who is free from faults and failings! It is a simple matter—"Keep your mouth" (as the Psalmist says.)[1]

Later in October, 1901, Cushing moved into the house at 3 West Franklin Street, next door to the Oslers, along with Thomas B. Futcher and Henry Barton Jacobs. Each of them maintained offices in the house and Cushing had a letterhead made up in the style of Osler's. The three were promptly given latch keys to the Osler house and invited to make free use of them, as indeed they did, especially for access to Osler's library. Futcher later married the daughter of R. Palmer Howard, Professor of Medicine at McGill when Osler was a medical student. He practiced in Baltimore until his death in 1938. Jacobs, in 1902, married Alice Frick Garrett. In 1932 he gave to the Welch Medical Library his extraordinary collection of books, prints, tokens, medals and autograph letters relating to the history of medicine, together with funds to provide appropriate space and facilities for the collection. At the dedication ceremonies Cushing delivered a charming allegory about the "latch keyer" days and described how "the man next door" (Osler) began leaving book catalogues at the house; how he, Futcher and Jacobs "each got the infection for which, like the common cold, there is no known preventive;" and how the mysterious brown-wrapped parcels with foreign stamps began to arrive at the house.[15]

FIGURES 11, 12. Cushing at Johns Hopkins, around 1900. From the Alan Mason Chesney Medical Archives, The Johns Hopkins Medical Institutions.

Cushing's early faculty years were occupied with clinical problems in general surgery and with the organization and teaching of the famous course in comparative surgery, the "dog surgery" still provided for Hopkins students. Photographs of him at this time show a young man of serious aspect, sometimes rather a dandy, sometimes less so.

In 1902 he and Kate were finally married after a very lengthy courtship and engagement, and took up residence at the 3 West Franklin Street address, where Grace Osler promptly took the new bride under her wing. Osler sent him an occasional consultation.

In 1903 the Cushings' first child, a boy, was born, and named William Harvey, not for the great physiologist, but for Osler and for "H.C." himself. Earlier that year Osler started Cushing on a Vesalius essay, loaning him a copy of the *Fabrica*.[16] Cushing determined then to begin to collect Vesaliana and in December, at Osler's Book and Journal Club, he read his first paper on Vesalius, "The Books of Vesalius". Thus began at Osler's instigation a bibliophilic and historical interest leading to one of the great Vesalius collections.

Cushing's interest in medical societies began at about this time, as he became involved in the newly formed Society of Clinical Surgery, with which he remained affiliated. An active member for many years, he served as its President in 1927. Echoes of Osler's strong advocacy of medical societies may perhaps be perceived here, as also in Cushing's membership in the American Neurological Association of which he was president in 1923, The American Surgical Association (President, 1927), Association for the Study of Internal Secretions (President, 1921), and numerous others, domestic and foreign, in which he held active or honorary memberships. In them he found the unity, friendship and intellectual refreshment noted by Osler to be the chief values of the medical society.[17] In 1919 he saw the organization, at his own suggestion, of The Society of Neurological Surgeons, first called The Neurosurgical Club, the first in the specialty and, just as he retired from his chair at Harvard and the Brigham, the Harvey Cushing Society was given form by some thirty-five of the younger of his professional offspring, the name having been adopted with his acquiescence. Thus he came to share with Osler, as a mark both of distinction and affection, the formation of a society dedicated to his example and carrying his name.

In July, 1904, Cushing set off for England for a month with Osler, Futcher and McCrae. A sketch he made, which bears witness to his artistic talent as well as to his sense of humor, alludes to Osler's habit of

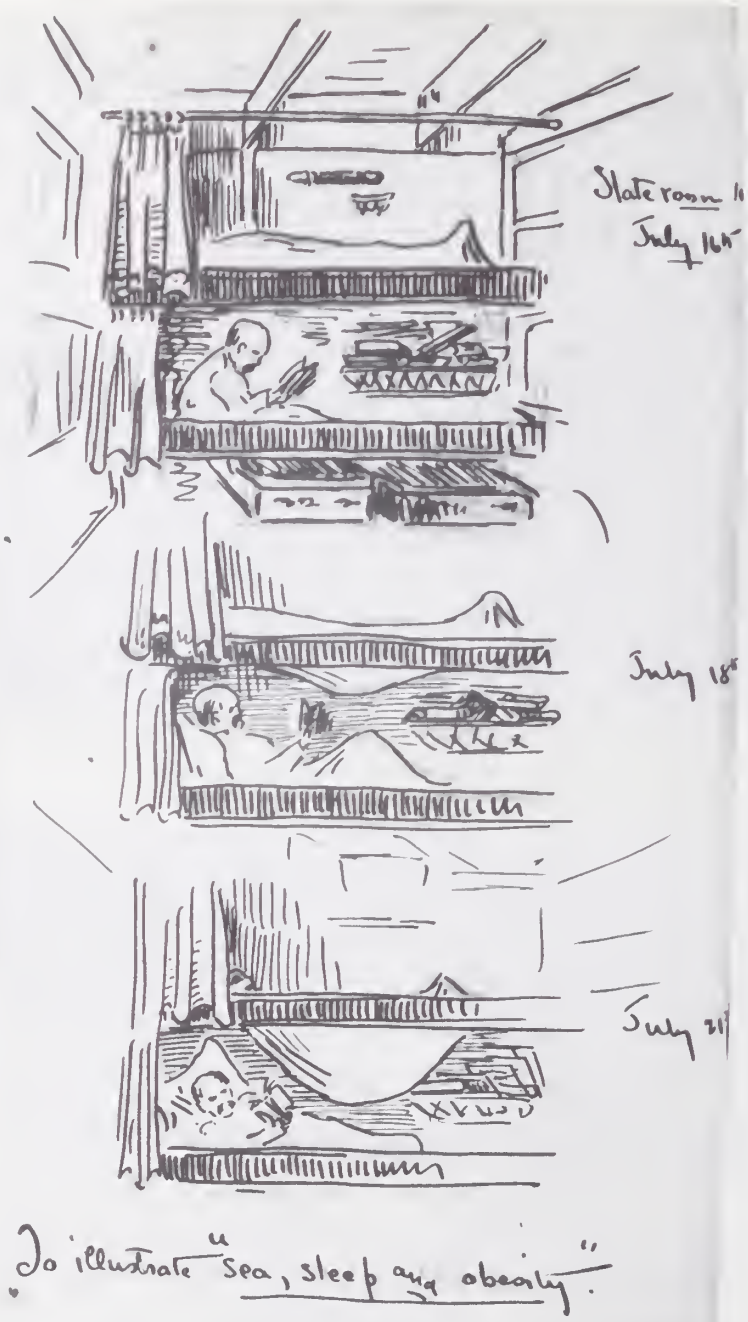


FIGURE 13. Cushing's shipboard sketch, 1904. Rapidly developing obesity in Cushing (upper berth) while Osler works steadily below. From the collections of the Historical Library, Yale Medical Library.

cramming the rack in his berth with books and papers, and working there for four or five hours each morning. The drawing further suggests the impact of the shipboard cuisine on Cushing's avoirdupois. It was on this trip, at a dinner with Rolleston and his young colleagues, that Osler asked, "Do you think I'm sufficiently senile to become Regius Professor at Oxford?" Other rumors of the Oxford offer came to the ears of Osler's traveling companions, and at one point he showed them the first line of Mrs. Osler's famous cable, "Do not procrastinate. Accept at once," covering over the last phrase, so that they remained uncertain until the return home what his decision was likely to be. In December Cushing read his famous paper, "Dr. Garth: The Kit-Kat Poet,"[18] an early venture into general literature, also undertaken at Osler's instigation. Garth had arranged for the funeral of John Dryden, and had had invitations printed. Cushing searched for years for one of these, but ultimately had to be satisfied with a facsimile.

The early days of 1905 were dominated by Osler's impending departure for Oxford. On February 22, he read his valedictory, the famous, or infamous, "The Fixed Period," and Cushing shared his amazement and distress over the storm that broke in response to it. Such was the reaction that it proved impossible to bring to fruition a plan to build a new library building at the Medical and Chirurgical Faculty of Maryland as a testimonial to Osler, or to purchase and

SIR,

YOU *are desired to Accompany the Corps of Mr.* John Dryden, *from the College of Physicians in* Warwick-Lane, *to* Westminster *Abby; on* Monday *the* 13*th of this Instant* May, 1700. *at Four of the Clock in the Afternoon exactly, it being resolved to be moving by Five a Clock. And be pleased to bring this Ticket with you.*

Dyd April 30th

FIGURE 14. From the collections of the Historical Library, Yale Medical Library.

preserve the house at 1 West Franklin Street as a further gesture of respect and affection, both projects in which Cushing had been a leading participant.

The Oslers' departure in May, 1905, was followed in the same year by a Christmas visit to Baltimore, during which the Cushings saw a good deal of them, as they did over the following Christmas when Kate Cushing held a reception for them to which more than three hundred people came. She later wrote her father-in-law that "about forty people stayed on to supper." Shades of the 'Open Arms', as the Osler home in Oxford was to come to be known! In 1907 Cushing's avid interest in medical history was expressed in a vigorous year's program of the Johns Hopkins Historical Club, of which he was president. At one meeting he read a paper entitled "Notes Concerning John Locke as a Physician," an interest he maintained in later years.

As his activities in neurosurgery increased and came to dominate his research as well as his teaching and his practice, Cushing became to an increasing degree a major figure in the surgical world. This concentration had begun around the turn of the century, with particular focus on trigeminal neuralgia, followed by increasing interest in the surgery of brain tumors and in refinements of operative technique. From 1908 to 1912 he turned his attention more and more to problems of pituitary disease and tumors of the cerebellum. By 1909, at the age of forty, he was publishing steadily in his field, speaking at major medical meetings and presenting invited lectures. Through these busy years his correspondence with Osler went on apace, and he preserved in his papers numerous notes, cards and more extended letters from both of the Oslers, some to Kate, some to himself, some to both. The personal notes from Osler covered a broad terrain, both geographically and in subject matter, but the most constant themes were books and medical history. Almost invariably they closed with love to the Cushing children, now three in number (William, Mary and Betsey).

Cushing at this point had matured not only in the more direct expressions of his professional life, but as a medical historiophile and collector. Thus, a trip to Oxford in the summer of 1909 was notable for examination of the *Fabrica* and *Tabulae Sex* and other Vesalius items at Merton, St. John's and the Bodleian, and in Basle, for a visit to the Vesalianum. Later, in Venice, he examined and photographed the Vesalian items in the Biblioteca Nazionale and the Libreria Vecchia. Later he hunted books in Florence. On this trip he gave invited lectures

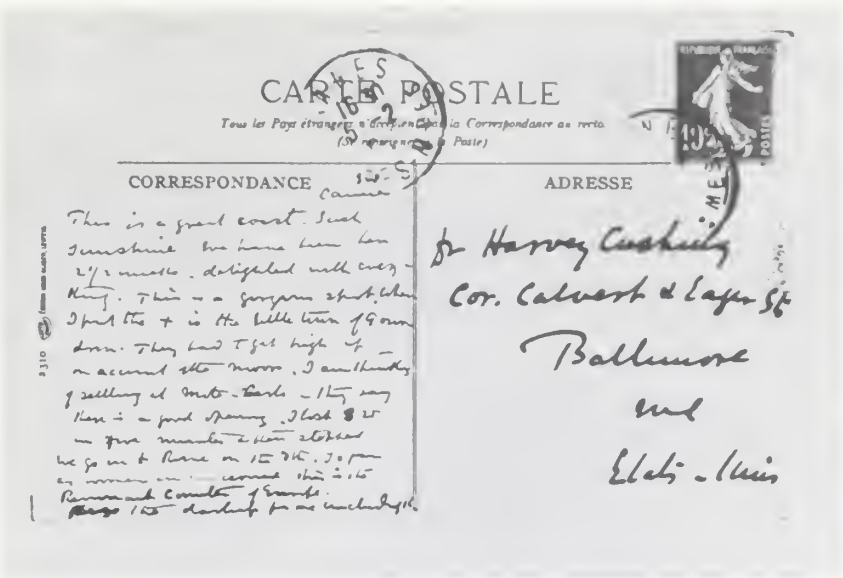


FIGURE 15. Card from Cannes, probably 1909:
"This is a great coast. Such sunshine. We have been here 2 1/2 weeks--delighted with everything. This is a gorgeous spot. Where I put the X is the little town of Gourdron. They had to get high up on account of the Moors. I am thinking of settling at Monte Carlo—they say there is a good opening. I lost $25 in five minutes and then stopped. We go to Rome on the 7th. So far as women are concerned this is the remnant counter of Europe. Kiss the darlings for me including K."From the collections of the Historical Library, Yale Medical Library.

at the University of Liverpool and at the International Medical Congress in Budapest, but his bibliophilic and historical interests were also given lively expression, much in the fashion of his mentor.

His Johns Hopkins years culminated in the publication of the great pituitary monograph, a milestone in the history of endocrinology. Beginning in 1901 he had been offered the chairs in surgery at the University of Maryland, Jefferson, Washington University, Yale and elsewhere, but declined them all. Finally, in 1910, when he was forty-one years of age, came the call from Harvard which had been long in his thoughts, and he accepted, with Osler's urging, the Moseley Chair and the position of Surgeon-in-Chief at the new Peter Bent Brigham Hospital. He and Henry Christian, the new Physician-in-Chief, a Johns Hopkins graduate who had trained with Osler, early established the principle of mandatory retirement from the Hospital staff at age sixty-three, a stricture Cushing came to rue when it was applied to him.

Within a year of the opening of the Brigham Hospital the full-time arrangement for clinical teachers was proposed for the Harvard Medical

School, and the General Education Board offered the University one and one-half million dollars for the introduction of a full-time system for the chiefs of clinic at the Hospital. Cushing and Christian had put in place an arrangement that permitted the care of private patients and the retention of the fees thus generated. In the ensuing discussions Cushing offered to step down as Surgeon-in-Chief if the University decided to accept the gift, and, in fact, put his resignation in President Lowell's hands. In addition to the financial considerations he doubted, he said, that such an arrangement would "activate" him, and feared it might in fact encourage indolence. He did not think he would become a more active investigator and he was concerned with the preservation of the personal relationship between himself and his patients. Thus, he occupied a position closer by far to Osler's original one than to Flexner's. In the event, Harvard declined both the gift and Cushing's resignation.[19]

In 1913, in London for the International Medical Congress, he gave one of the three principal addresses. Cushing's speech contained a call for reform in medical education and for recognition of the role surgery had come to play in medicine. He called for directors of hospital units in continuous service, without practice outside the institution, rather than "visiting" appointees, and urged bringing the students to the bedside. This amounted to "a frontal attack upon the vested interests of the British hospital system, in which a student could pass an examination in surgery . . . without ever having entered a surgical operating theatre."[20] Along the way he delivered a vigorous attack on the antivivisectionists, a battle he had joined on numerous prior occasions. As might be expected, his remarks on medical education and training and on the decline of animal experimentation in Britain drew fire, and Osler rose to his defence in a letter to *The Times.*

The war in Europe found Cushing, in December, 1914, organizing a Harvard medical unit which sailed on March 18, 1915. It served with distinction in Neuilly with the *Ambulance Americaine* for two months or so, an interval in which Cushing saw many head and spinal cord injuries. Two years later, in May, 1917, he sailed to France again, this time with Base Hospital No. 5, a Harvard Unit, which he had largely organized. His extraordinary war journals contain a detailed daily record of his experiences, extending to some nine volumes of one thousand pages each. In addition he kept clinical records on each of the many cases on whom he personally operated.

The War involved the Oslers from the start. Lady Osler organized numerous supporting activities in Oxford—clothing for the troops in France and for those dislocated by the fighting; help with hospital

FIGURE 16. Cushing at the Ambulance Americaine, *Paris, 1915. From the collections of the Historical Library, Yale Medical Library.*

arrangements in Oxford, and so on. Sir William, having been made an honorary colonel in 1908, when the "territorials" were organized, was never called up. Nevertheless, he was almost feverishly active, serving as Physician-in-Chief of the Queen's Canadian Military Hospital near Folkestone, and as consultant to a number of other Canadian and American military hospitals. He attempted, without success, to introduce mandatory typhoid vaccination for the Army, the effort being beaten back through the combined efforts of the antivivisectionists and the antivaccinationists, both deeply opposed to any compulsory legislation of this nature.[21]

The Oslers' mounting concern for their son, Revere, is apparent in their notes and letters of the time. Initially in the Quartermaster Corps, the boy transferred to the artillery to be nearer the action. Osler himself had a premonition from the first, according to Cushing, that the war would bring him personal sorrow. When the blow fell, on August 30, 1917, Cushing was a half-hour away from Revere, and, with Crile, helped while Darrach and Brewer operated in an effort to repair the shrapnel wounds of the abdomen. He wired a warning to Oxford and, when Revere died the next morning, Cushing saw him carried to his grave covered by a Union Jack. He wrote, "A strange scene—the great-great-grandson of Paul Revere under a British flag, and awaiting him a group of some six or eight American Army medical officers—saddened with the thoughts of his father."[22] Correspondence from the Oslers over the next few days revealed their heartbreak, of course, but also something of what Cushing meant to them. Osler's notes of a year and two years later echoed the same feelings:

> 13 Norham Gardens
> Oxford
>
> 8/31/17
> "Dear Harvey—What a comfort to feel that you were with the laddie at the end and that someone who loved him and that he loved was near. We are heart-broken but shall face the ordeal bravely. With deepest gratitude, yours affectly—Wm Osler."
>
> (From the Osler Library of the History of Medicine, McGill University)

To Cushing from Lady Osler:

13 Norham Gardens,
Oxford

8/31/17
"Dearest Harvey—Our one comfort is that you were with him. No one in the world could have done as much and no one been fonder of him. I can only think what an agony it was to you when you saw him come in . . . Dear Revere, he was living for his leave—a letter last evening told what we would do—I hope he knew you and could talk to you—it is very hard—and we are getting old. There was a fine life in store for the boy—but it couldn't be. I always expected this to happen—but I never could be ready . . .. What a marvel it is that we have you all to help us—and your children . . ..
Our love,
Tante Grace"

(From the Osler Library of the History of Medicine, McGill University)

To Mrs. Cushing:

13 Norham Gardens,
Oxford
Aug 31, 1917

"Dear Kate,
The sole comfort in our sorrow is that Harvey was with the dear laddie at the end. Was there ever anything more fortunate! Of all men he is the one we should have chosen to be near Revere at the end. We cannot tell you what a consolation it is to us. Grace keeps up bravely and we are going to bear our sorrow with patience, but we are just heartbroken as you may suppose. He had grown more and more lovable as the years passed and he and I had so much in common.
Blessings on you all.
Yours affectionately
Wm Osler"

(From the Osler Library of the History of Medicine, McGill University)

To Mrs. Cushing from Lady Osler:

Oxford
September 1st, p.m.

"O Kate, dear Kate, my darling fair baby has gone—just laid in that wet cold Belgium. I thank God for two things—your Harvey was with him and he has gone to a peaceful spot. I feel sure of that—and we are rather old and may go too, very soon—we hope so—just fancy Harvey being with him—we are waiting and waiting for his letter and I'm sure he will come here on his first leave—and perhaps bring some messages he couldn't write. I can only see Revere lying on his stretcher with Harvey holding his dear, dirty hand. It is our comfort—our only comfort today to think Harvey was there and you'll be glad too."

and later:

> Aug 30th (?)
> 13 Norham Gardens,
> Oxford
>
> "Dear Harvey
>
> Just a year ago poor Isaac was taken and the one bright spot in the tragedy was that you were with him. It has been a hard year but we have stood it better than we could have expected. . . . "
>
> (From the Osler Library of the History of Medicine, McGill University)

From Jersey:

> "A line of love and thankful remembrance for all you did for the dear laddie two years ago. I think of what it must have meant to him to open his eyes and see his dear friend beside him. How hard it must have been for you! But to us it is and has been an inexpressible comfort. Who was the nurse? I do not believe we ever had her name. Best love to you all. Yours ever, Wm Osler."
>
> (From the Osler Library of the History of Medicine, McGill University)

After the war Cushing returned to the pace and the program of activities to which he was accustomed. Within six months of his return from Europe he wrote and published anonymously a history of Base Hospital No. 5.[23]

He had already attempted, in 1917 and 1918, to establish a National Institute for the Investigation of Disorders of the Nervous System, through the help of the General Education Board, and was prepared to give up the Moseley Chair to join it. After protracted negotiations the proposal died, as Fulton said, "of inanition," having failed to attract support from the Rockefeller and Carnegie Foundations as well as the War Department, all of whom he had approached.

During 1919 he helped to put together The Osler seventieth birthday volumes and in May he sent Osler, as a birthday gift, Clemenceau's thesis for his doctorate in medicine, of which, as it turned out, Osler already had a copy.

Cushing had become increasingly concerned about Osler's health after Revere's death. Lady Osler had written that he was sleeping badly and losing weight. During Osler's final illness Cushing was kept aware of the situation, and was finally advised by cable of his death on December 29. The brief memoir quoted at the beginning of this paper

was written shortly thereafter, but even before, four days after Osler's death, he wrote an obituary notice which appeared in the *Boston Evening Transcript.*[24] It was a moving tribute to Osler's personal qualities, written in Cushing's clear and powerful style, and it persuaded Lady Osler that he should be entrusted with the biography rather than William S. Thayer, of Baltimore, as she had originally planned. In her letter she alluded to the unique closeness of their relationship. "I know of only one man worthy and able to do it and that is *you*, and printed by the (Oxford) Press—I can say no more. I leave the answer to you. There is no one here who knows everything—medicine, brain, home, friends, heart, endurance, in fact all that he was—you know all."[1] And a day later, after hearing Sir Humphrey Rolleston's enthusiastic reaction to the idea, she wrote again, "I have come home with my mind and heart full of it and am sending this second note to you to ask if you will think seriously of it. I am convinced there is no one else who understands as you do."[1] Fulton noted, "clearly this was a request which H.C. could not decline. Osler had meant everything to him for twenty years. He had been a spiritual father and had had a keener understanding of Cushing's own restless nature than almost anyone. He had done much to inculcate in H.C. his love of literature, history, and his undying interest in Vesalius."[25] Cushing accepted.

Although he had originally estimated that the research would take about a year and the writing six months, in the event his labors on the biography took some four years; they were characterized by his unfailing thoroughness and his desire for detail. He read biographies and discussed biographical writing with Boston friends. He spent months in Oxford, canvassed friends and colleagues of Sir William for letters and details, peppered Lady Osler for minutia, sometimes to her exasperation, and depended heavily on her letters. Finally, in 1924, he had a manuscript of one million words, edited later, at the insistence of the Oxford University Press, to about 650,000. Lady Osler received her first bound copy of *The Life of Sir William Osler* in March, 1925, and the book was officially published on April 16.

That the book was a labor of love there can be no doubt, and the avalanche of praise that greeted it, including the Pulitzer Prize in 1926 and the acclaim of Osler's friends, must have been substantial indeed. Even more, the satisfaction of having done this for his friend and mentor, for his "spiritual father," and for Lady Osler, must have warmed his heart and eased his mourning. It is of interest that Cushing left

himself out of the biography completely, except by inference or circumlocution. He had read Henry Festing Jones' life of Samuel Butler before writing the biography, and had been irritated by the way in which Jones had brought himself into the story; Fulton felt this had lent weight to the decision to efface himself from the 'Osler.'

Criticism came too, though, importantly, from his old friend Welch, who reviewed the book for the *Saturday Review of Literature.* Welch felt that Osler's objections to the full-time system had been overdrawn. Certain Philadelphians felt that he had been unfair to William Pepper. But on balance the book was immensely successful, not only as a literary effort, but, as time proved, by the degree to which it accomplished the purpose expressed in the dedication: "To medical students, in the hope that something of Osler's spirit may be conveyed to those of a generation that has not known him; and particularly to those in America, lest it be forgotten who it was that made it possible for them to work at the bedside in the wards." Indeed, the greatest contribution made by the biography has been the degree to which it has helped to keep Osler a palpable and powerful presence among his professional descendants.

While writing the book Cushing continued to be productive not only in his clinical work, but in teaching and writing. Between January, 1920, and the end of 1924, when the final chapters of the biography went to press, he published fifty major papers and reports. He had by this time a personal series of more than one thousand brain tumors operated upon, and had begun to classify and analyze the clinical behavior of the various types, an effort never previously undertaken.

Honors came to him in abundance in these years. In 1922 he was offered Halsted's chair, but responded that he could not face another transplantation. He continued to write on historical subjects, and organized a program at Harvard in 1923 in celebration of the centenary of Pasteur's birth. His connections with British medicine continued to grow. In 1922 he was made a "Perpetual Student" at St. Bartholomew's Hospital in London and in the same year gave the Cavendish Lecture in which he introduced the term 'meningioma.' At a dinner preceding the lecture Sir Arthur Keith, proposing the health of the Cavendish Lecturer, said no man was better fitted to cement the brotherhood of the medical professions in the two great English-speaking countries. In this one may infer that he was filling at least this pair of Osler's shoes.

A sadder echo of Sir William's life came in 1926, when Cushing's son Bill was killed in an automobile accident in Connecticut. Thomson[26] has noted how heavy a blow this was to Cushing, for he and the boy had had a relationship that was often tempestuous and difficult. In the last two years of William's life a degree of rapprochement had been developed, though the full fruition of this was denied them both. As a result, Cushing's grief was undoubtedly the greater. In 1927 he established the William Harvey Cushing Research Fellowship in Surgery in memory of his son.

Although he had maintained his scientific productivity at a high level (thirty-five papers in 1926, '27 and '28), he continued to speak and write in a philosophical vein. Many of the papers of this genre were developed from speeches, some delivered to graduating classes in medicine, and thus addressed to the young, some marking the openings of libraries or other scholarly facilities, and some celebrating important anniversaries such as the Lister centenary. His style was at least as felicitous as Osler's, his topics often the same timeless ones, and his allusions to the dignity and importance of the practicing doctor as heartfelt and respectful. The impression emerges, on reading these reports, that Cushing, although clearly having modeled himself on his mentor, was not so much imitating him as representing, in effect, an extension, a continuation of Osler and Osler's influence on those broad areas of medical education, practice and research which both viewed as vital. One of his general addresses, "The Medical Career," was presented at Dartmouth College in 1928. It contains a recommended reading list for students considering medicine as a career, a list reminiscent of Osler's Bedside Library for Medical Students; and it is surely more than coincidence that Cushing's first volume of collected essays carried the Latin title of the index paper—*Consecratio Medici*. Shades of *Aequanimitas*, and of the Master!

He could lighten his literary efforts with an amusing anecdote. For example, in the Dartmouth speech he described a visit by President Wheelock of Dartmouth to a lecture given at the medical school by Nathan Smith in 1798. Wheelock was so impressed, Cushing relates, that " . . . at the ensuing evening prayers in the old chapel he gave thanks as follows: 'O Lord, we thank Thee for the Oxygen Gas; we thank Thee for the Hydrogen Gas; and for all the gases. We thank Thee for the Cerebrum; we thank Thee for the Cerebellum; and for the Medulla Oblongata. Amen'".[27]

In May, 1929, the Osler Library at McGill was dedicated, and Cushing was present. He had been invited, to his delight, to represent the Osler Club of London. (Mrs. Cushing was forbidden by him to attend because she had defied his injunctions against smoking cigarettes[28]). He wrote later that Thayer's remarks at the dedication ceremonies were "inspired—the best thing I have ever heard him give." Cushing was especially pleased with Thayer's tribute to W. W. Francis, who had spent nine years revising Osler's library cards and preparing the catalogue (*Bibliotheca Osleriana)* for press, and who made ready the library for shipment to Montreal after Lady Osler's death in August, 1928. This trip appears to have been a seminal event in Cushing's thinking about the eventual disposal of his own books.

In 1929, in honor of his sixtieth birthday the *Archives of Surgery* published a Cushing *festschrift* consisting of papers by many of his former trainees. It was in a sense, an echo of the Osler seventieth birthday volumes. Welch at about this time began to importune him to come back to Hopkins as his (Welch's) successor in the Chair in the History of Medicine and Yale invited him to consider returning to New Haven as Professor of Neurology or Neurosurgery. Two years later, on the eve of his retirement at the Brigham, Harvard offered him a Professorship of the History of Medicine.

He retired at Harvard on September 1, 1933, twenty years to the day after his arrival, and left Boston a month later for the New Haven chair in neurology he had decided upon. The next seven years, his last, were spent there in continuing scholarly activity, including work on his great meningioma monograph and the brain tumor registry. He became involved in an active national debate on compulsory health insurance and attempted to moderate the adament stand taken by the American Medical Association. Later he published several extracts from his nine-thousand-page war journal, and attempted, through his family contacts with President Roosevelt, to secure appropriate housing for the Surgeon General's Library. He was active in the Elizabethan Club, a literary society at Yale. In 1938 he returned to Oxford for the last time to receive, in the ambience he had come to know through Osler, the D.Sc. *honoris causa.*

The great projects of his final years were bibliophilic ones, the disposition of his library and the Vesalius bio-bibliography. He had originally planned to have his books sold at auction after his death, but when he began to think of leaving his collection to Yale he conceived of

joining his to those of Arnold Klebs and John Fulton, to form the basis of a medical historical collection at the Medical School—and so it came to pass as he had wished, and the architectural plans for a suitable facility were drawn, though he did not live to see it built. Here now, accessible

FIGURE 17. Cushing at the emergency entrance of the New Haven Hospital; taken between 1935 and 1939. He has written at the bottom, "Unmistakably an emergency." Courtesy of Elizabeth H. Thomson

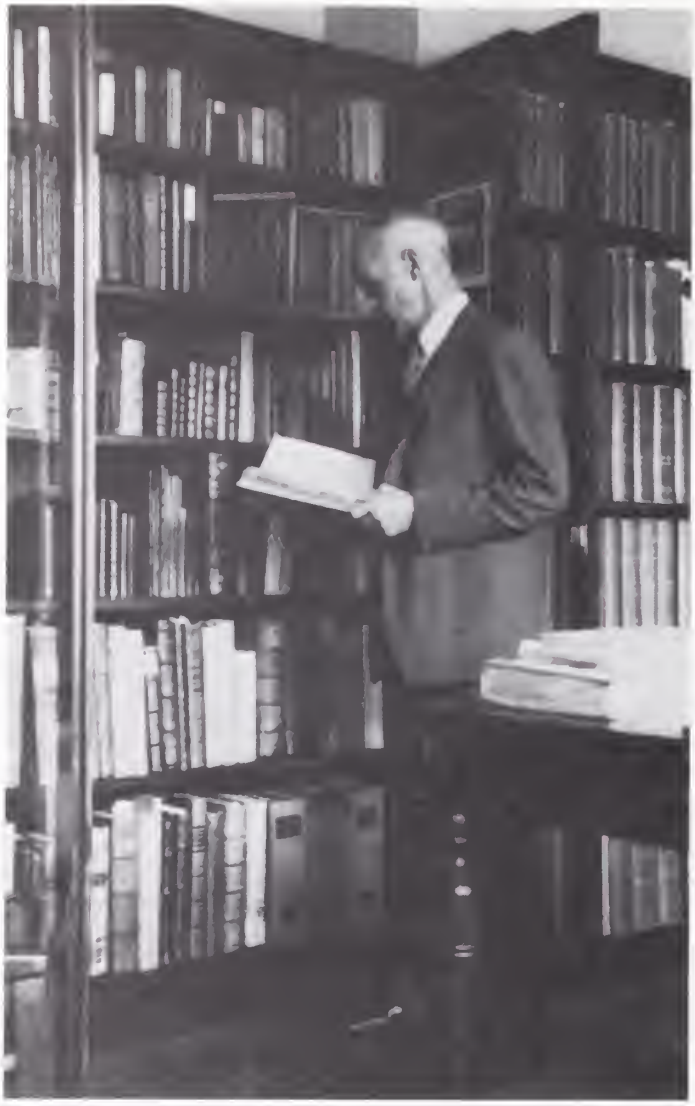


FIGURE 18. Cushing at Yale, late 1930s. From the collections of the Historical Library, Yale Medical Library.

to students as he insisted they should be, and in company with the equally well-loved collections of his two friends, reside his papers and journals, his desk and chair and, in the high-ceilinged, panelled reading room, the great collection of Vesaliana. Over the fireplace, lit by the rays of the afternoon sun coming in through high clerestory windows, the Calcar Vesalius portrait, and under it, cut in the stone of the mantel,

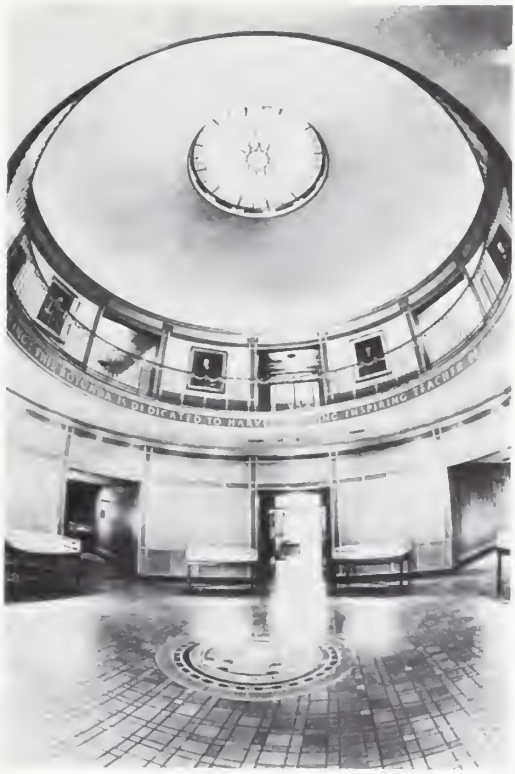


FIGURE 19. Rotunda of the Yale Medical Library. The arms of the universities which awarded him honorary degrees are reproduced on the walls. From the collections of the Historical Library, Yale Medical Library.

George Stewart's lines, beginning, "Here, silent, speak the great of other years . . . ", and ending, " . . . but you, be you but brave and diligent, may freely take and know the rich companionship of others' ordered thought", an eloquent injunction, and a fitting epitaph for William Osler's friend.

Department of Medicine
The New York Hospital-Cornell Medical Center
449 E. 68th Street
New York, NY 10021

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The Complex Psychology of C. G. Jung

FRED B. ROGERS

CARL G. JUNG, conducting word-association tests at the Burgholzli mental hospital in Zurich, Switzerland near the turn of this century, discovered a link between thought and feeling which he termed a "complex". This connection of conscious idea and unconscious emotion was subsequently extended by Jung and others from individual to group concepts. Dr. Jung initially called the discipline *Komplexen Psychologie* in his native German, but later renamed it 'analytical psychology', its present designation.[1]

Properly balanced, the complex whole of one's mind provides a unity which determines normal mental activity. A theme of wholeness runs through Jung's theories. Mental illness, he thought, was characterized by disunity of the personality, while mental health is manifested by unity. In his medical practice, Jung applied this concept in psychotherapy. To him psychotherapy meant the art of alleviating a patient's difficulties through the agency of words and through a personal, professional relationship. In work with Jung and in Jung's writings Dr. Henry A. Murray of Harvard University found "a hive of great suggestiveness," and a congenial recognition of, among other things, the importance of imagination and intuition in mental life.[2]

In Jung's view the complex is a system of repressed desires and memories that exerts a dominating influence upon one's personality and perceptions. He believed that man's behavior not only reflects the conflicts which are relics of human history, but also his aims and aspirations. The psychology of the complex therefore is paramount to understanding individual or group behavior. In therapy Dr. Jung employed his complex or analytical psychology to promote awareness of the patient as a person. To this end he wrote: "As a physician . . . my duties lie with people who are ill. . . . Psychic suffering is . . . the symptom of a wrong attitude assumed by the total personality. We can therefore hope for a cure to result only from a treatment of the personality as a whole."[3]

Dr. Rogers is Professor of Family Practice and Community Health at Temple University School of Medicine.

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Signed photograph of C. G. Jung (National Library of Medicine, Bethesda, MD).

Extended to a wider sphere, aggregate behavior in groups of people also depends upon a balance of thinking and feeling currents. In his last book, *Man and His Symbols* (1961), Jung wrote as follows about complexes and archetypes, the latter being broader patterns of ideation and emotion:

> "Just as personal complexes have their individual history, so do social complexes of an archetypal character. But while personal complexes never produce more than a personal bias, archetypes create myths, religions, and

> philosophies that influence and characterize whole nations and epochs of history. We regard the personal complexes as compensations for one-sided or faulty attitudes of consciousness; in the same way, myths of a religious nature can be interpreted as a sort of mental therapy for the sufferings and anxieties of mankind in general—hunger, war, disease, old age, death."[4]

Jungian thought is more useful for self-understanding, however, than for any quick-cure of mental disorder. F. Scott Fitzgerald spoofed the Swiss psychiatrists who treated his wife, Zelda, in this anecdote from the *Note-Books:*

> "I'm having them all psychoanalyzed," he said, "I got a guy down from Zurich, and he's doing one a day. I never saw such a gloomy bunch of women; always bellyaching wherever I take 'em. A man I knew told me he had his wife psychoanalyzed and she was easier to be with afterward."[5]

In June 1930 Zelda Fitzgerald was admitted to the sanatorium of Prangins, on Lake Geneva, under the care of Dr. Oscar Forel. Six months later, at his and her husband's request, Dr. Eugen Bleuler, Jung's mentor at Burgholzli and an authority on schizophrenia, came from Zurich to assess the patient's condition. Both psychiatrists rendered a guarded prognosis concerning her illness, and she returned to the United States in the following year.

Increasing interest in Jung's ideas among professional and general readers is a reflection of his profound insights. Dr. Robert A. Clark, emeritus clinical professor of psychiatry at Hahnemann University and a Fellow of the College of Physicians of Philadelphia, was an associate of Carl Jung and a translator of his writings. Psychological centers bearing Jung's name are active in this and many other countries. Dr. James Hillman, former director of studies at the C. G. Jung Institute of Zurich and now at the University of Dallas, Texas, recently observed: "His ideas are valuable because they are so good to work with and against. Good ideas, like Jung's, allow the widest play for thought."[6]

Temple University School of Medicine
3400 North Broad Street
Philadelphia, PA 19140

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Changing Patterns of Disease

BENNETT LORBER

SUMMARY: Fascinating and dramatic changes in disease patterns have occurred in the brief period of the last fifteen years. Many interesting changes have been seen in the realm of infectious diseases and can be attributed to change in lifestyle, immigration and the effects of medical progress.

SOME of the most striking and interesting changes in disease patterns have occurred among those caused by transmissable agents. To simplify my discussion I'll restrict my remarks to changes that have appeared in the time since I graduated from medical school in 1968. Lest you think this time too brief—approximately fifteen years—I assure you that this is not too short a period to recognize variations. Let me present some pertinent illustrations.

It is important to consider the difference between infectious and contagious diseases. Contagious (communicable) diseases are those which are transmitted from one person to another. Infectious diseases are those due to microorganisms or their products. All contagious diseases are infectious but the majority of infectious diseases are not contagious. Chicken pox is a contagious infectious disease; malaria is a non-contagious infectious disease.

What alterations take place in disease patterns? The most dramatic is an occasional recognition of entirely *new* diseases. Some of these are, in fact, old illnesses for which a cause has been recognized. Diarrhea due to *Campylobacter,* now considered the most common cause of bacterial gastroenteritis, serves as an example.

Some diseases, on the other hand, do seem to be recent or at least more common than was previously thought. Acquired immunodeficiency syndrome (AIDS) is the most obvious and lamentable example. In addition, some old diseases are now appearing in new places. Malaria is being seen increasingly in the United States civilian population, which is no surprise since approximately six million Americans each year are travelling to tropical countries. We must also remember new populations at risk, such as renal transplant recipients who, due to immunosuppression, are susceptible to opportunistic infections. Some old organisms have

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apparently adopted new tactics. Toxic shock syndrome, the result of a previously unknown toxin, is produced by a familiar pathogen, *Staphylococcus aureus.* To further confuse us, some old infections are appearing in new guises clinically, such as atypical measles in adolescents and young adults who received measles vaccine prior to 1967. Infant botulism, first recognized as a clinical entity distinct from foodborne botulism in 1976, now presents the picture of an infant between the ages of one and six months collapsing with a neuroparalytic illness, flaccidity and hypotonia due to *Clostridium botulinum* growing in the intestinal tract and liberating a potent toxin.

Consider the new ecological niches for such long-recognized germs as osteomyelitis of the small bones of the foot caused by *Pseudomonas aeruginosa,* an organism that thrives in the inner layer of sneakers constantly worn by some children prone to this infection.

Finally, we're becoming aware of variations in signs and symptoms due to new modes of disease transmission, such as cytomegalovirus virus transmission through organ transplantation or granulocyte transfusion.

What causes these changing patterns? At least three factors are to blame: (1) changes in lifestyle, including sexual behavior, travel, diet, leisure activity and changes in the work force; (2) immigration and (3) the effects of medical progress.

Pause for a moment to consider the "new diseases." As recently as 1968 none of those listed below were part of our medical vocabulary. The list is an impressive one including, as it does, illnesses caused by a full range of infectious agents due to bacteria, viruses, protozoa, fungi and their toxins:

"New" Infectious Diseases, 1968–84

AIDS
Babesiosis
Lassa fever
Toxic shock
Lyme disease
Infant botulism
Kawasaki's disease
Non A, Non B hepatitis
Chlamydia trachomatis pneumonia
Legionnaires' disease
Pittsburgh pneumonia
Delta virus hepatitis
Branhamella pneumonia
Invasive external otitis
Campylobacter enteritis
Amebic meningoencephalitis
Vibrio parahemolyticus enteritis
Clostridium difficile diarrhea, etc.

The list includes such diseases as Babesiosis, a malaria-like illness seen mostly on Nantucket Island, caused by a protozoan parasite of red blood cells transmitted to man and Lyme disease, which is transmitted by ticks and presenting with an unusual rash and chronic arthritis. The agent is a spirochete of the genus *Borrelia.*

Kawasaki's disease, which is probably of infectious etiology, produces in children symptoms of fever, skin and mucous membrane lesions, lymph node enlargement and sometimes aneurysms of the coronary arteries.

Many of us recall Legionnaires' disease, a sporadic pneumonia, occasionally epidemic, first recognized in Philadelphia in 1976.

Another new entry to our medical vocabulary is amebic meningo-encephalitis, a rare but devastating infection of the central nervous system. It affects individuals swimming and diving in freshwater lakes and apparently is caused by a free-living ameba of the genus *Naegleria.*

In recent years we have also come to know the causes of some older diseases such as antibiotic-related colitis arising from a toxin produced by the bacterium *Clostridium difficile.* We've also learned that Cat Scratch disease is traceable to a small gram negative bacterium.

As we acquired and recognized new diseases we eliminated one very old one—smallpox. It is hard to exaggerate the importance of the eradication of smallpox and no discussion of the topic under discussion would be complete without a brief review of how this was done.

Smallpox was truly an ancient disease; examination of the mummified remains of the Egyptian pharoah, Ramses V, who died about 1160 B.C., suggests that he died of it. Through the centuries it was a major scourge of mankind affecting the worldwide population and causing death in twenty to forty percent of those infected. Many survivors were left blinded by the infection; indeed at one time smallpox was the leading cause of blindness in Europe.[1]

In 1967 the World Health Organization began a program directed toward the total eradication of variola. Eradication seemed to be possible because: (1) smallpox is a severe disease and easily recognized because of the rash; (2) subclinical cases do not occur; and (3) infectivity accompanies the rash and is proportional to its severity. Sick people are not effective disseminators of infection since they don't spread disease during the pre-eruptive phase—a time when they are often prostrated by fever and out of the mainstream of community life; (4) the chain of transmission could be broken by isolating affected individuals and

immunizing local populations at risk; (5) recurrent infectivity is unknown (unlike hepatitis B, for example, there is no chronic carrier state); (6) no known animal reservoir exists for the virus (unlike yellow fever or plague); and (7) we have an effective, cheap, plentiful and convenient vaccine which is stable and does not require refrigeration. The eventual success of the eradication program was due in large measure to two innovations: the development of a simple, sterile, disposable two-pronged innoculation needle and to a new epidemiological approach—surveillance containment. The latter amounted to nothing more than finding cases and immunizing susceptible individuals in the community.

The program worked! In 1967 smallpox was widespread in more than thirty countries and affected ten to fifteen million people a year; two million died every year of this infection. In 1977, ten years after the eradication program began, the last naturally acquired case of smallpox on the face of this planet was identified.

Of the new infectious diseases, none has aroused as much scientific interest and public concern as the acquired immunodeficiency syndrome, or AIDS. The epidemic continues, and there have been more than 7,000 cases in this country since the syndrome was first recognized 1981. AIDS is due to infection with a retrovirus called human T-cell leukemia-lymphoma virus III, or HTLV-III. A related virus, HTLV-I is the first virus shown to cause human cancer. HTLV-I infects lymphocytes and transforms them into immortal malignant cells. HTLV-III infects lymphocytes and kills them, resulting in profound abnormalities of the immune system and rendering the victim susceptible to unusual opportunistic infections and cancers. Learning at a molecular biology level why HTLV-I immortalizes the same cells killed by HTLV-III may yield important clues to the nature of cancer.

It appears that the AIDS virus may be able to infect lymphocytes only after they have become activated by some other stimulus (another infectious agent, perhaps). This phenomenon may be part of the explanation for the epidemiology of AIDS and its preponderant appearance in certain at-risk populations. A serologic test to detect the AIDS virus is now available for research purposes. Screening studies that employ it suggest only a small proportion of those infected with the AIDS virus actually develop the disease. Using this test it has been shown that almost ninety percent of American hemophiliacs and many healthy Haitian children have been infected with HTLV-III. The need

for activation of the T-cell before it can be infected by HTLV-III may explain the phenomenon of occult or sub-clinical infection.

The pattern of AIDS itself is interesting. The groups at risk, homosexual or bisexual men, drug addicts, hemophiliacs and Haitians, are well known. What is less well known is that seventy-five percent of the cases in our country come from four states; New York, California, Florida and New Jersey; and that in New York many of the patients are black drug addicts. In California the overwhelming majority of AIDS victims are white homosexuals. Contrastingly, in Africa it appears that transmission is primarily through heterosexual contact.

It is hard to believe that any good has come out of the tragedy of the AIDS epidemic, but there is evidence that AIDS itself has had a salutary effect on the changing patterns of disease. In 1982 reporting of the AIDS story by the news media mushroomed; and by the end of 1982 most homosexual men in this country knew that seventy-five percent of AIDS was occurring in homosexual men, that it was probably due to a sexually transmitted agent, and that a large number of sexual partners was a risk factor for AIDS. Incidence of gonorrhea is a sensitive indicator of changing sexual behavior (gonorrhea is common in homosexual men, is easy to detect and has a short incubation period). In a study at the Denver Metro Health Clinic the prevalence of gonorrhea in various groups was compared for the first three months of 1982 and 1983. A thirty-two percent reduction in its prevalence was seen in homosexual men with no change in heterosexual men or women. Here is an example of fear of acquisition of a rare, but dread, disease leading to a modification of sexual behavior and, as a by-product, a diminution of a more prevalent sexually transmitted disease.[2]

One of the striking features of social evolution in this country has been a change in attitudes toward sexual permissiveness. In a study done by the National Opinion Research Center at the University of Chicago a national sample of adults was asked its views of premarital intercourse. The percentage accepting premarital intercourse was twenty percent in 1963, fifty percent by 1970 and seventy percent by 1975. In 1980 it was estimated that three-quarters of all brides and nine out of ten grooms were non-virginal at the time of marriage. A widely disseminated poster from the mid-nineteen-fifties warning of the dangers of syphilis and gonorrhea shows a well-scrubbed All-American girl with the words, "She may look clean—but". If anyone has any question that there have been changes in attitudes toward sexuality, try

to imagine the response to this poster on the average college campus today!

In 1968, I was acquainted with the five traditional venereal, or as we now call them, sexually transmitted, diseases: syphilis, gonorrhea, chancroid, granuloma inguinale and lymphogranuloma venereum. A list of the diseases *now* recognized to be sexually transmitted includes, in addition to these: AIDS, scabies, amebiasis, shigellosis, salmonellosis, giardiasis, campylobacterosis, hepatitis B, genital warts, *Chlamydia* urethritis and pelvic inflammatory disease, trichomoniasis, genital herpes and others. One interesting sub-group of sexually transmitted disease pattern change consists of infections due to intestinal pathogens like ameba, *Giardia* and *Shigella*, which are communicated through sexual activity in homosexual men.

One sexually transmitted disease, genital herpes, has reached epidemic proportions. The number of patients seeking help from general physicians for genital herpes has increased more than five fold in the last fifteen years. Seldom has an epidemic received so much attention—the cover of a national news magazine, no less—and the public is so concerned that those free of the disease advertise the fact by wearing badges in singles bars that declare them "Herpes Free."

Another tantalizing variable in epidemiology is the influence of new populations at risk.

> In June 1984 the rate of diarrheal illness increased at a day-care center in Philadelphia. Thirty-four percent of the 59 children attending the center had diarrhea. Stool specimens were examined for enteropathogenic bacteria, viruses, and parasites.
>
> Sixty-five percent of symptomatic children and eleven percent of asymptomatic children had *Cryptosporidium.*[3]

Cryptosporidium is a protozoan parasite of the gastrointestinal tract that has only recently been identified as a cause of human gastrointestinal disease. It is a well-known cause of diarrhea in animals; the first human case was reported in 1976. From 1976 to 1982 only seven human cases were reported and these almost exclusively in veterinarians and animal research workers. With the AIDS outbreak came recognition of *Cryptosporidium* as the cause of a protracted, wasting and frequently fatal diarrheal illness in AIDS patients. Initial cases were diagnosed by bowel biopsy; soon it was discovered that the parasites could be fairly easily demonstrated in stool specimens using a new isolation technique and an acid-fast stain.

The causes of the majority of cases of diarrheal illness in this country remain unknown and are not due to the usual pathogens such as *Salmonella* and *Shigella*. Application of the isolation and staining technique which came out of AIDS research has shown that *Cryptosporidium* is common in immunologically normal persons in whom it produces a self-limiting illness, as was seen in the described day-care center outbreak. In 1984 alone the Centers for Disease Control investigated seven outbreaks of cryptosporidiosis in children attending day-care centers.[4]

Recognition of *Cryptosporidium* as a new disease-causing organism is, of course, interesting, but it is noteworthy that the illustrative example occurred in a child day-care center. By 1978 more than one-half of the nation's families with children under the age of thirteen had a work-related need for some type of day-care. The divorce rate doubled from 1965 to 1975, and in the twenty years from 1962 to 1982 so did the number of working women, with mothers of preschool children constituting the highest rate of increased participation in the work force. During this same time the number of single-parent households increased; twenty-three percent of United States children now have only one parent in the home. At present more than eleven million children are in part or full-time day-care. Many of these children are young infants and toddlers who are more commonly infected, are at greatest risk for infection and, due to lack of fecal continence, their need to be handled by staff, and their tendency to explore the work with their mouths, are more likely to transmit infections to others.

In the last five years day-care center outbreaks have been reported due to *Salmonella, Shigella, Campylobacter, Giardia, Clostridium difficile,* hepatitis A, *Hemophilus*, rotavirus, cytomegalovirus, group A streptococci, varicella, *Cryptosporidium*, and a variety of respiratory viruses. Thus it is clear that changing life style of working parents and the increasing use of day-care has brought with it a changing pattern of disease.

A similar change has occurred at the other end of the age spectrum. The advancing average age of the population and the growing use of nursing homes has generated another new population at risk. Nursing home outbreaks of influenza, varicella-zoster, a variety of diarrheal agents and *Meningococcus* have all been reported.

Another feature of American lifestyle is an altered diet. Trends in diet habits and food fads are reflected at once in the distribution of disease. *Sushi,* a Japanese raw fish delicacy has become fashionable

throughout our country, and the prevalence of *sushi* bars brings new hazards.

> In September 1980 a 26-year-old male California physician developed abdominal pain, distention, belching, diarrhea and weight loss. After 8 days of symptoms, he passed a four-foot long tapeworm of the genus *Diphyllobothrium.* Symptoms resolved after niclosamide therapy, and the stool became negative for helminths.
>
> Ten days prior to the onset of symptoms the patient attended a party at which *sushi* prepared from raw tuna, red snapper and salmon was served. Three other physicians who attended the same party and ate *sushi* developed symptomatic tapeworm infection.[5]

Until recently the drug niclosamide, used to treat tapeworm infections, was available only from the Center for Disease Control. The year 1979–1980 saw a four-fold rise in requests for niclosamide from American physicians treating native Americans for tapeworm infestations which to a large degree were a consequence of the growing popularity of dishes made from raw fish.

Fish tapeworm infections in this country were for a long time seen mostly in Jewish housewives who tasted the raw fish while preparing gefilte fish. With the popularity of *sushi* the pattern of this infection is changing. Tapeworms are not the only hazard of *sushi*; anisakiasis or infection with the roundworm, *Anisakis*, is also being described.

The dietary habits of our immigrant population have contributed to new patterns of disease. Man also is infected by eating raw or imperfectly cooked crabs or crayfish which contain the larval form of *Paragonimus* which lodge in cystic spaces of the lung and cause chronic pulmonary complaints. Adult flukes resemble coffee beans and may live five or six years, allowing symptoms to develop distantly in both time and place. Cavitary lesions may easily be confused with tuberculosis or lung cancer.

Paragonimiasis is prevalent in the Far East where, in many countries "drunken crab" is a favorite dish—crabs immersed in an alcoholic beverage are eaten raw when they stop moving. In 1979–80 more than 260,000 refugees entered America from Indochina. Accordingly, paragonimiasis, once almost unknown in our country, is occuring increasingly and must be considered a diagnostic possibility whenever complaints are centered in the lungs.

Whirlpools, spas, and hot tubs which were virtually non-existent a few years ago are now widely enjoyed by many people privately at home and in a variety of health and leisure clubs. With new pleasures come new problems.

> Eight teenage girls attended a slumber party, spent one to two hours in a privately owned wooden hot tub, and slept in their bathing suits.
>
> Within 48 hours all the girls developed a pruritic rash with papulo-vesicular lesions mainly on the trunk, and ranging from a few dozen to a few hundred in number. The rash was most prominent in the areas covered by swimsuits, especially the buttocks. The girls soon referred to their problem as "Hot Tub Buns."
>
> *Pseudomonas aeruginosa* was cultured from the skin lesions. All skin lesions resolved in 10 days without scars or recurrences.[6]

This is an example of a new entity, namely, *Pseudomonas* folliculitis, which, with otitis externa is caused by the bacterium *Pseudomonas aeruginosa,* is associated with the use of hot tubs, whirlpools and recreational waterslides, and was first described in 1975. Outbreaks involving as many as 265 people and sporadic cases have occurred in association with public as well as home facilities. A few serotypes have been responsible for most cases, and the illness is quite characteristic. After being in a hot tub or the like, and after an incubation period of hours to a few days, exposed individuals develop a papulo-vesiculopustular rash which is commonly pruritic. Constitutional symptoms such as fever are minimal in the majority of cases. The disease is self-limited, lasting two days to two weeks, and generally requires no treatment. The rash spares the head, neck and mucous membranes and is most prominent on the trunk particularly in those areas covered by bathing suits. *Pseudomonas*, due to a predilection for moist environments, is one of the organisms commonly referred to as "water bugs" and is usually killed by routine chlorination. Aeration, agitation, high bather load and the high temperatures employed in hot tubs all serve to shorten the activity of chlorine. Hyperchlorination may be necessary to control *Pseudomonas* organisms.

Leisure offers other options than hot tubs. Many Americans prefer to trek through mountains and woods of our country. This brings them into contact with the beauties of nature and some of its less appealing features—ticks. There has been a steady increase in our incidence of Rocky Mountain Spotted Fever, which, to a large degree, may be attributed to an increase in woodland expeditions.

Increasing numbers of people, the young particularly, enjoy leisure in the use of drugs which, as we will see, as a source of latent pathogens brings new risks and bizarre distribution of disease.

> From December 1980 to February 1981 *Salmonella muenchen* was isolated from 36 persons with severe diarrheal illness in eastern Ohio and 26 persons in Michigan.

> Teenagers and young adults accounted for an unusually large number of cases. A search for activities common to this group was initiated.
>
> Seventy-five to eighty percent of patient households had a history of marijuana use; a case control study showed patients were more likely than matched controls to live in households where marijuana was in current use (p less than .001).
>
> Marijuana from patient households was found to be contaminated with *Salmonella muenchen.*[7]

Medical progress in the last fifteen years has brought with it new modes and patterns of disease transmission.

> Twenty-two days after receiving a corneal transplant, a forty-one-year-old housewife developed malaise, tinnitus, and had difficulty swallowing. Later in the day she complained of chest discomfort and had aerophagia, dyspnea and insomnia. Within hours she developed aerophobia and then hydrophobia and died. Brain tissue obtained at autopsy was positive for rabies.
>
> A twenty-five-year-old man also died of rabies, thirty-three days after corneal transplant of the right eye.
>
> Both recipients had received corneal grafts from the same donor, a sixteen-year-old boy who had died following an unidentified illness.[7]

Here is an example of a new mode of transmission for an ancient disease, namely, the transfer of rabies by human to human tissue transplantation. The first such case occurred in 1978 in a thirty-seven-year-old corneal transplant recipient from Boise, Idaho.[9] The transplant came from a thirty-nine-year-old man who died of what was believed to be Guillain-Barré syndrome. Obviously, corneal donor tissue should never be taken from an individual who died of an unspecified neurologic illness.

Another disease that can be transmitted by corneal transplant is Creutzfeldt-Jacob disease, a horrible and slowly progressive illness characterized by dementia. Creutzfeldt-Jacob disease exemplifies another important development of the last fifteen years: recognition of an entirely new type of transmissible pathogen.

Creutzfeldt-Jacob disease is one of two diseases now known to be caused by transmissible agents called prions. The other is scrapie, a disease of sheep. It has been a central dogma of biology for the last generation that the nucleic acids DNA and RNA were the lowest common denominators of life, and that all reproducing organisms and agents, however otherwise differing, were at least similar in sharing genetic material of nucleic acid. The principle that genetic information invariably flows from nucleic acids to proteins has been called the

central dogma of molecular biology. But prions stand out as amazing exceptions to this rule. They are very small agents capable of replicating in mammalian cells while containing no nucleic acids. They appear to be single proteins about one hundred times smaller than the smallest viruses. In addition to being the cause of Creutzfeldt-Jacob disease and scrapie, prions are suspected to be the cause of other human diseases including kuru, and they have recently been implicated as a possible etiologic agent for Alzheimer's disease, the major cause of senile dementia and the fourth leading cause of death in the United States.[10] Diseases in which prions have been implicated are classified as slow infections characterized by very long incubation periods of months, years, or even decades in which the host is without symptoms. Thus we see that one dramatic change in the last fifteen years is our recognition of an entirely novel form of infectious agent and a change in our understanding about the pathophysiology of infectious diseases and the rate at which infections may evolve.

> In June 1981, a seventeen-year-old American arrived in Kenya as an exchange student. He took chloroquine prophylaxis for malaria weekly and returned to the United States at the end of August. He continued to take chloroquine prophylaxis until the end of September. Five days after the last dose of chloroquine, he had fever, headache and chills. He was found to have *Plasmodium falciparum* malaria.
>
> His blood chloroquine level was higher than that required to suppress chloroquine sensitive strains. He was treated for chloroquine-resistant malaria with a good response.[11]

Americans are travelling abroad with increasing frequency. Last year about six million of them journeyed to exotic parts of the world where malaria, schistosomiasis and filariasis are endemic. In addition to more pleasant souvenirs, some are returning with infections which first appear on arrival and which, because of their rarity in this country, are often not thought of by American physicians. In the ten years from 1973–1983 more than 2,500 cases of malaria were reported among United States citizens who acquired infection while travelling abroad. Related to this is the ever increasing problem of chloroquine resistant malaria which has necessitated a new approach to prophylaxis during travel to many parts of the world.

Advances in medical progress have brought many benefits. The introduction of an effective mumps vaccine in 1967 has led to a continued decline of this common disease of childhood. Similarly, the availability of an effective measles vaccine has brought a ninety-nine

percent reduction from previous rates. This is the good news; the bad news is that medical advances have brought with them certain complications as well.

> A twenty-two-year-old man underwent renal transplantation for end stage Glomerulonephritis. Five months post transplant, while receiving large dose corticosteroid immunosuppression, he began to have low grade fever, mental confusion and mild headache.
>
> Cerebrospinal fluid showed a mild pleocytosis with budding yeast on India ink preparation.
>
> Cerebrospinal fluid cultures grew *Cryptococcus neoformans.*

This case illustrates one of the major complications of medical progress: opportunistic infections in transplant recipients and other immunosuppressed hosts.

Cryptococci, opportunistic yeasts, are now the major cause of central nervous system infection in immunosuppressed individuals. A recent study from Massachusetts General Hospital of such infections in the setting of chronic immunosuppressive diseases or therapy concluded that *Cryptococcus* was the most common infecting agent. Almost half of the patients in the series were renal transplant recipients.

Another major group illustrating an altered clinical picture as a result of medical progress is infections which complicate a variety of foreign body implants including prosthetic heart valves, prosthetic joints, cerebrospinal fluid shunts, hemo-and peritoneal dialysis access sites, intrauterine devices, fetal scalp moniters, ocular lens implants and central venous catheters among others. Many of these are due to *Staphylococcus epidermidis,* a common skin organism once thought to be avirulent and of significance only as a laboratory contaminant.

Any list of infectious complications of medical progress includes fungemia as a complication of total parenteral nutrition, bacteremia transmitted through contaminated blood products, atypical mycobacterial abscesses following augmentation mammoplasty implants, multiple antibiotic-resistant bacteria, mononucleosis syndromes following cardiac bypass surgery, and transfusion-induced AIDS. There are many others.

The last fifteen years have brought a change in the identity of organisms responsible for hospital infections. The *Staphylococci* responsible for the majority of hospital infections in the 1950s and early 1960s have been replaced by gram-negative rods, many of which are highly resistant to antibiotics. A burgeoning pharmaceutical industry has attempted to provide newer and more active antimicrobial agents,

but in many instances, almost as soon as a new drug is released, bacteria appear that are resistant to it. In many instances, bacteria are able to transfer antimicrobial resistance across genus lines by means of pieces of extrachromosomal DNA known as plasmids.

Drug-resistant bacteria are a serious problem, and there can be no question that physicians have contributed to it by widespread and indiscriminate use of antimicrobial agents. An analogy is useful. When we use antibiotics it is as if we are passing legislation. We are in effect ruling that any germ susceptible to the agent and exposed to it will not be allowed to survive. If we passed a law today specifying that any man over five feet in height, with hair on his head and wearing clothes will be shot on sight then, by tomorrow, we would have a lot of short, bald, naked men running around. The same is true of antibiotics; they select and permit the survival of those bacteria not affected by the law, that is, those which are resistant.

We have looked at some of the emerging patterns of disease which have occurred in the recent past. What of the future? Imagine, for one example, what we might see as manned space flight becomes more and more part of the fabric of daily life. Every day we shed millions of bacteria from our bodies with exfoliated senescent skin and in respiratory secretions. These microorganisms fall harmlessly to the ground. Think of the possibilities for disease transmission as these agents remain suspended for long periods of time due to zero gravity!

Earlier I discussed the eradication of smallpox. In October 1977, Ali Maow Maalin, a cook from Somalia, had the distinction of being the last victim of naturally acquired smallpox on the surface of this planet. He is living proof that through understanding of biological and epidemiological principles together with advancing technology, international cooperation, and determined human industry, man can make great strides against his historical afflictions.[1] Perhaps as we study contemporary disease patterns we shall learn the lessons that will lead to even greater successes.

Section of Infectious Diseases
Temple University Health Sciences Center
Philadelphia, PA 19140

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R. Tait McKenzie—Athlete—Physical Educator—Artist

DAVID Y. COOPER

SUMMARY: Scattered throughout Philadelphia, the world, and particularly the campus of the University of Pennsylvania are numerous statues, medallions, memorial plaques, and bronze wall panels. These works of art are the creations of a remarkable man, a physician, the first to hold a full chair as professor of physical education in America, R. Tait McKenzie. McKenzie was not only an artist, he was a superb physician, anthropologist and public health enthusiast as well as a pioneer in sports medicine and physical rehabilitation.

Physician and artist, R. Tait McKenzie was a Canadian who loved his Scottish ancestry, so much so that when he died his heart was removed and buried in Scotland. He was born in the manse of the Free Church of Scotland near Ottawa on May 26, 1867. His father, William McKenzie, was descended from a long line of Scottish Highland farmers, many of whom were clergymen. His mother, Catherine Shiells, likewise was Scottish. The parson died when Tait was nine years old and his widow brought up the children in the house built for her by the congregation as a gift of affection. McKenzie's first schooling was in a small school run by a blacksmith who had switched to the teaching profession. After finishing his secondary education, McKenzie enrolled at McGill University in 1885, graduating as an M.D. in 1891. At the University he had to earn his way and spent his summer vacations surveying expedition trails between Indian reservations in Alberta, checking shipments for the Montreal Steamship Company, and working for his uncle, John Belians, at a lumber camp. While in medical school he became an assistant in the gymnasium. From the outset McKenzie wanted to be a great athlete but his body at first was too frail. With persistent work, however, he became a gymnastic champion and a football player.

After graduation from McGill, McKenzie continued to work in the athletic department. An attack of typhoid fever interrupted his house-surgeonship while permitting him to visit England as a ship's surgeon. On his return in 1894 he was appointed Medical Director of Physical Training, a post created especially for him. To prepare himself for this position he took a course on the subject given by Dr. Dudley Sargent at

Dr. Cooper is Professor of Surgical Research at the University of Pennsylvania School of Medicine.

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Harvard. McKenzie instituted the first compulsory medical examinations for students in Canada and in 1896 extended his work to teaching and working in the anatomy department at the McGill Medical School. It was at this time (around 1900) that he became interested in modeling human faces in clay to illustrate his paper on the facial expression of effort, breathlessness, and fatigue.

In 1904 McKenzie accepted the newly established chair of Physical Education at the University of Pennsylvania, the first position of its type to carry the rank of full professorship. J. William White, the John Rhea Barton Professor of Surgery who heard McKenzie lecture, realized that this was the man to fill the new chair of physical education, and it was through his efforts that McKenzie was chosen. McKenzie, a charming man devoted to his students, pursued the career of an academician as well as that of an artist. His motto was not that of the ancients, "a sound mind in a sound body" *(mens sana in corpore sano),* but "an eager mind in a lithe body" *(mens fervida in corpore lacertoso).*

This appointment changed McKenzie's life. Upon his arrival he began to show his talents in many fields related to physical education. He became an anthropologist, for example, and collected the measurements of athletes who excelled in the various sports, collaborating with Dudley Sargent of Harvard and with athletic directors throughout the world. In his collected papers in the archives at the University of Pennsylvania is table after table of such measurements, employed to determine the proper body proportions of the athletes in his statues.

McKenzie was intensely interested in anatomy simply as an art. In the introduction to his book, *Art and Anatomy,* he makes this statement:

> The artist and the anatomist began their journey towards the understanding of the human body along the same road, and hand-in-hand, together, they studied the bony skeleton, the mechanism of the joints, the position, the action and the size and shape of muscles and up to this point they agree fairly well. This is but a short distance along the road, and here they come to a dividing of the ways. The anatomist goes along the road that leads to the study of artery, nerve and brain; his interest is in internal organs and in minute structure of the tissues. While the artist takes the other turn of the road, he studies the indication of the surface of what lies beneath; the difference between the form and texture of skin lying over a bone as compared to its appearance when over a muscle or fat is of great importance to him. The distribution of the layer of fat that softens the harshness of the muscular form and gives grace and softness to the contour of the female forms, occupy with him a place which to the anatomist would seem unnecessarily great. The position of every branch of the nervous system is of his weight to him the expression of a movement by the tension or relaxation of a muscle group. The change in form caused by the movement

> of a joint is to him a study pregnant of meaning,—the starting into relief of a tendon, the change of a leg or eyebrow, mean more to him than all the cross sections that were ever stained. To him the anatomist bending over his microscope or teasing out the tissue with forceps or scalpel, appears as Bunyan's man with the muckrake, he is absorbed with quibbling in the dirt that does not see the crown of gold above his head.

McKenzie intensively studied the anatomical reports of Henry Meige and Paul Richer, two French anatomists, who constructed paper maché models of the muscles of the body and how they appeared when covered with subcutaneous tissue and skin. In his collection there is a paper on anatomy and art by Thomas Eakins. Doubtless this had little influence on McKenzie, for the folds remain uncut.

Early in his career in Philadelphia, McKenzie began to campaign for the development of parks and playgrounds where children could exercise in a crowded city. This is an excerpt from one of his many talks, "Efficiency by Physical Education":

> If a child could only grow up in the country without any restraint or without the need to prepare himself to become a member of a civilized community, there would be less need to take precautions against his growing up a weakling, than there is in America, where now more than sixty percent of our population lives in the city.
>
> More than twenty-three percent spends from three to five hours a day in school, and if we take these hours from the natural occupation of the child which is play, we accept the responsibility which is scarcely realized by most people.

As a result of his efforts many parks and playgrounds were built in cities through the eastern part of the United States. Although none bear his name, many contain his memorial plaques or statues.

McKenzie had no formal training as an artist. He first took up this discipline to illustrate his article, "The Facial Expressions of Violent Effort, Breathlessness and Fatigue," for the *Journal of Anatomy and Physiology* (1900).

In his position as head of Physical Education at Pennsylvania, McKenzie constantly observed the bodies of athletes performing such feats as running, jumping, and pole vaulting. Seeing these beautiful artistic forms led him to idealize the perfect athlete's body in bronze. The results remain as such statues as *The Sprinter, The Ice Bird, The Modern Discus Thrower, The Pole Vaulter,* and *The Plunger.*

In 1915 Tait McKenzie volunteered to enter the Canadian army, fighting in Europe prior to America's entry into World War I. He was

assigned as Lieutenant to the Aldershot Hospital and shortly thereafter applied for its course in physical education. One of the texts used in the course was his book, *Exercise in Education and Medicine.* One day McKenzie was amused when his young instructor asked if the McKenzie who wrote this book was any relation of his. In time he became connected with the establishment of reconstruction depots for wounded and disabled soldiers—convalescent camps of Europe, Canada, and America that did so much to restore the disabled to a useful life. He was promoted to Major and placed in command of the first "Command Depot" at the Heaton Park Camp at Manchester (1915–1916). The experience derived from his duties resulted in the publication, *Reclaiming the Maimed; A Handbook of Physical Therapy*, as well as several shorter articles on the same subject. His article in *The British Medical Journal* of August 1916 begins:

> A great military hospital may be compared to a general post office in which sick and wounded from the front are sorted out into first, second and third class matter. First class matter is sent directly to regular military hospitals; second class matter requires an additional stay in a convalescent hospital, commanded by an officer of the Royal Medical Corps. The third class matter, however,—the cases too tedious for the hospital and the convalescent camps—are more difficult to provide for and dispose of. During the first year of the war they were referred from depot to depot always finding that they were at the wrong address, and it was not until last autumn that the Director General was able to give his attention to these cases that had begun to accumulate in considerable numbers. He arranged a series of command depots . . . the object of these depots was to return every man to active service by treatment (if possible): to return men fit for light service abroad who could replace fit men in light duties on lines of communication, to fill positions requiring light duties at home by men who were unable to do more than to release a better man for active service; and to discharge from the army those for whom no treatment could be expected to give further results.

and he concluded:

> Nearly 50% have been rendered fit for active service, and have rejoined their units in the fighting line.
>
> About 15% have been sent to lines of communication abroad.
>
> About 15% have been sent to useful work of a sedentary character at home; and
>
> Over 20% have been discharged as permanently unfit, many of these being untreatable from the first.

Thus McKenzie was one of the pioneers of physical education and rehabilitation.

When he returned to the University of Pennsylvania, McKenzie applied many of these military approaches to management of the Physical Education Program at Pennsylvania and the student body. As he had previously done in Canada, he instituted required medical examination for all students at the university. Concerned with the deformities inflicted by infantile paralysis and scoliosis, he developed programs to strengthen individuals so afflicted. From physical examinations McKenzie found that many students suffered from hallux valgus and Morton's toe, foot deformities that restricted their physical activities, and he worked on methods to improve their foot hygiene and treat these problems. He also wrote extensively on tuberculosis and its prevention by building sound bodies through proper diet, exercise, and improved living conditions.

Although McKenzie's interest was primarily in physical education, application of his ideas had a great pioneering influence in fields of public health, hygiene and sports medicine.

McKenzie, the Artist

World War I had a strong impact on Tait McKenzie, for it destroyed the bodies of the athletes he had tried so hard to build. It was natural for him to set out to depict the spirit of these unsung heroes in the war memorials, such as *Over the Top,* (Canadian National War Memorial), *The Radnor War Memorial* (Radnor, PA), *Captain Guy Drummond* (created for the soldier's mother, the work is now displayed in the Canadian Archives, Ottawa), *Lt. Col. George H. Baker* (Lobby of the House of Commons, Ottawa), *The Homecoming* (Monument to the Men of Cambridge), *The Aviator* (St. Paul's School, Concord, New Hampshire), and *The Victor* (War Memorial, Woodbury, New Jersey).

The three most impressive and significant works of Tait McKenzie are *The Youthful Franklin* at the University of Pennsylvania, The Scottish American War Memorial (entitled *The Call*) in Edinburgh, Scotland, and the statue of General James Wolf in Greenwich Park near London. These are more than bronze figures of heroes; they are depictions of the moments of first resolve, the moments of potential victory.

The first of the three, *The Youthful Franklin,* stands at the western end of Franklin Field, in front of the Hutchinson Gymnasium. McKenzie felt that Franklin should not be portrayed at the University he founded as a venerable sage, founder of his nation's greatness in both politics and

science. This would be appropriate for the state house, but not for the university, where there were youths eagerly facing the future as he faced it when he arrived in Philadelphia as "Poor Richard." The idea for this statue came from Franklin's description in his autobiography of his walk from New York to Burlington and his arrival in Philadelphia on a Sunday morning. To emphasize the point, Franklin's words are inscribed on its base.

> I have been more particular in description of my journey, that you may compare such unlikely beginnings with the figure I have since made there.

McKenzie made every effort to ensure that the costume was true to life and he actually found contemporary advertisements describing the clothing of runaway servants of that day (Franklin himself said he was suspected of being such a runaway). The period of the journey represented is Franklin's fifty-mile walk from Amboy to Burlington; he is portrayed as a youth with a springing gait, a bundle of clothes, a stick he picked up along the way, and a determined look toward the future.

His second masterpiece is *The Call,* The Scottish American War Memorial in Edinburgh. The Honorable A. B. Houghton made this statement at the unveiling ceremonies:

> Today we commemorate the Great War with the figure of a common soldier—one youth separated from the thronging files of recruits pressing from behind—one youth within the sounds of the pipes and drums and within the sight of the old Castle on the hill—one son of Scotland from a mansion or a manse or a mine, from a farm or factory, from a Glasgow close or an Edinburgh lane—it matters not. For he came from all these. He kept lonely company with his own soul in a tank or in a trench, on the sea or in the sky. And he went to his death alone.

In his great war memorial McKenzie has aimed at representing not war and the horrors and the agonies it bestows on the body but the searching spirit needed by the youths of those years when serving their countries.

The main figure of the statue is the seated figure of a kilted youth who holds his rifle across his knees and who looks intensely towards the Castle on the rock. There is no identifying insignia on his uniform and his sporran bears the Lion of Scotland. On the three-foot pedestal supporting the figure is inscribed "The Call, 1914, A Tribute from men of Scottish blood and sympathies in America to Scotland. *'A people that jeoparded their lives unto the death in the high place of the field'—Judges v. 18.*"

Behind is a twenty-five foot frieze underlined with the inscription,

> If it be life that waits I shall live forever unconquered, if death I shall die at last strong in my pride and free.

On the bronze panel are a column of miners, steel workers, laborers, fishermen, and businessmen marching behind a platoon of eight kilted soldiers led by a sergeant with a swagger stick under his right arm. Leading the procession is a pipe and drum band; the bass drummer proudly raises his sticks on high.

The last of Tait McKenzie's great works is the statue of General James Wolf in Greenwich Park, London. This is the only memorial England accorded its great general, James Wolf, who gave them Canada. Wolf was not only brilliant; he was also a man with the vision to see the future of Canada. He wrote his mother of this in 1759: "North America will some time hence be a vast empire, the seat of power and learning. There will grow a people out of this little spot, England, that will fill this vast space . . . "

The Medical School of the University of Pennsylvania is enriched by other works of R. Tait McKenzie: a small statue of Joseph Leidy (the bronze model for the statue at the Academy of Natural Sciences of Philadelphia), two bronze panels of Nathaniel Chapman and Samuel Jackson, medallions honoring Crawford Long, Paul Lewis, Francis Kenlock Huger, and John Herr Musser, and the Mary Ellis Bell prize medal awarded for student research.

Around Philadelphia there are three castings of McKenzie's small sculpture *The Crew,* a model of a crew lifting its shell prior to placing it on the river. Upon inspection, one realizes that the shell is a fish, a pike, with its open mouth showing sharp teeth. In the curled tail sits the coxswain with his horn. The aggressive fish lifted by eight crew members with perfect bodies depicts McKenzie's idea of competition.

Tait McKenzie was a charming gentleman with a sense of humor that was sometimes grim, but never caustic or demeaning. He warned his friends of his decreasing vitality as the years passed and joked about the "intolerability of meeting beyond the Styx a group of bores one has suffered from during life." He was concerned about the medical profession's choice of the Caduceus as its symbol rather than the true symbol, the staff of Aesculapius, a single snake coiled around a wooden club. McKenzie wrote that this was a grave error, for the Caduceus is the staff of Hermes—Mercury—the god of commerce, of bankers, usurers and cattle thieves, not that of the god of medicine.

Just prior to his death on April 28, 1938, McKenzie remarked to a friend that he hoped for another commission for a statue honoring medical research in which he would portray a youthful, enthusiastic investigator with the inscription *"Nondum, O Mors"*—"Not yet, O death."

On April 13, 1935, Tait McKenzie presented The College of Physicians of Philadelphia with thirteen medals and medallions. These were: (1) the medal of Aesculapius designed for E. B. Krumbhaar for the award at Undergraduate Medical Association Day for the most distinguished research paper, (2) the William Woods Gerhard Medal, (3) the Crawford Long Medallion—anesthesia, (4) the William Burns Sander's Medal for Nursing, (5) a medal honoring Francis Kenlock Huger (a member of class of 1797 who made an unsuccessful attempt to rescue General Layfette from the prison at Olmutz), (6) the W. W. Keen Medal, (7) the S. Weir Mitchell Medal, (8) the medal commemorating Sir Arthur Keith, (9) a medal honoring Chevalier Jackson, (10) a medal honoring Sir Robert Jones of Liverpool, England, (11) a medal honoring the famous medical missionary, Sir Wilfred Grenfell, (12) an attempt to depict Captain Henry Drummond and (13) an attempt to depict Dudley Allen Sargent, McKenzie's old Harvard Teacher. McKenzie's talk at the college that night ended:

> It gives me great pleasure, Mr. President, to turn over to your safekeeping this collection of medals and this catalogue, containing a full description of them and of other large pieces either permanently placed elsewhere or too large to put in the small compass of a case like this.
>
> I trust they may serve as a start in the formation of a collection which will eventually be worthy of this great College of Physicians, of which we are so proud.

The following appeared in the *Scotsman,* Thursday, September 8, 1938.

> In a grassy plot in the church yard at the south eastern corner of Saint Cuthbert's Parish Church Edinburgh, not far from the Scottish American War Memorial in West Princess Street Garden, which was the work of his hands, the heart of Dr. Tait McKenzie was buried yesterday afternoon. The internment took place privately before the annual service at the memorial.. .. It was the desire of the sculptor that his heart should be buried in front of the memorial. Under existing regulations it was not within the power of the Corporation to grant the request however, and the alternate site in the nearby church yard was accepted.

The burial service was simple and brief. Lord Provost Sir Louis Grumly, His Grace the Duke of Atholl, K.T., Dr. J. Narrian Henry, President of the Scottish American Association of the United States of America, and Mr. E. N. Campbell, N.S., acted as pall bearers. The casket of dark polished oak with silver mountings on the white cords was reverently lowered into the grave which was lined with ivy and privet leaves.

University of Pennsylvania
School of Medicine
36th and Hamilton Walk
Philadelphia, PA 19104

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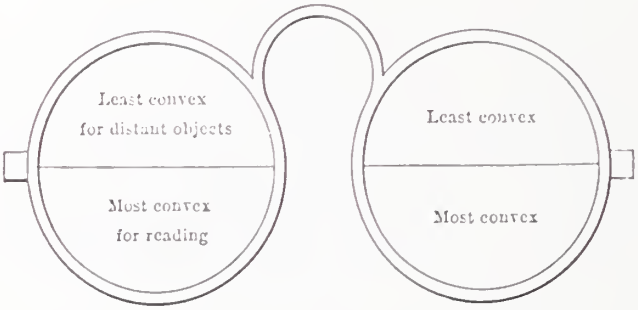
Department of Retrospection

BY Mr. Dollond's[1] Saying, that my double Spectacles can only serve particular Eyes, I doubt he has not been rightly informed of their Construction. I imagine it will be found pretty generally true, that the same Convexity of Glass, through which a Man sees clearest and best at the Distance proper for Reading, is not the best for greater Distances. I therefore had formerly two Pair of Spectacles, which I shifted occasionally, as in travelling I sometimes read, and often wanted to regard the Prospects. Finding this Change troublesome, and not always sufficiently ready, I had the Glasses cut, and half of each kind associated in the same Circle, thus,



By this means, as I wear my Spectacles constantly, I have only to move my Eyes up or down, as I want to see distinctly far or near, the proper Glasses being always ready. This I find more particularly convenient since my being in France, the Glasses that serve me best at Table to see what I eat, not being the best to see the Faces of those on the other Side of the Table who speak to me; and when one's Ears are not well accustomed to the Sounds of a Language, a Sight of the Movements in the Features of him that speaks helps to explain; so that I understand French better by the help of my Spectacles.

1. Peter Dolland (1730–1820), optician.—Ed.

From *The Writings of Benjamin Franklin,* Collected and Edited with a Life and Introduction by Albert Henry Smyth. 1907. New York: The Macmillan Company. vol. IX (1783–1788).

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REVIEW

YASARGIL, M. GAZI. 1984. *Microneurosurgery.* 385 pp. illus. New York: Thieme-Stratton Inc.. Price $120.00.

Reviewed By FREDERICK MURTAGH

THIS is the first of a four volume treatise on mocroneurosurgery, and documents the vast experience of an author who has performed more than four thousand operations on the brain through the operating microscope—fourteen hundred for cerebral aneurysms, four hundred for arteriovenous malformations and over twenty-four hundred for cranial and spinal tumors.

Included in the book are anatomical, neuroradiological, operative, neuroanesthetic, and pathologic considerations. Volume II will deal with clinical considerations, early and late results of operated intracranial aneurysms, problems and results in patients with multiple and giant aneurysms, results of nonoperated cases and complications of surgery. Volumes III and IV will present microsurgery of arteriovenous malformations and tumors.

The first fifty pages of this volume present an incredible display of the basilar cisterns of the brain and the contained cranial nerves, arteries and veins as viewed through the operating microscope in the living subject. The photographs are superb and are complemented by clear, well-labeled, pen and ink drawings in color and with diagrams. The result in a magnificent view of an anatomical world hitherto reserved only for the operating microscopicists, and a better understanding of this area, which is not even remotely considered in the general study of anatomy based on dissection of anatomical specimens.

The next one hundred twenty pages are devoted to a detailed mapping of the vascular structures of the brain. Here again, the author's attention to detail is unparalleled, covering every major arterial branch of the brain while emphasizing the tiny penetrating branches which supply anatomical areas of importance in surgical dissection. The more commonly encountered anatomical variants are depicted, leaving the reader convinced that there is no "normal" regional anatomy, only a

Dr. Murtagh is Professor of Neurosurgery at the University of Pennsylvania, Philadelphia, PA.

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basic plan with as many variations as the branches on a tree. The venous drainage system, often overlooked, is considered as well, with superb illustrations.

Section II is a review of all the available diagnostic studies, from lumbar puncture to MRI, that are of value in demonstrating and understanding subarachnoid hemorrhage and cerebral aneurysms. Of special note is the account of cerebral angiography, "the definitive study", and it's role in confirming a diagnosis, identifying an aneurysm, and demonstrating multiple variations and anomalies of anatomy and collateral blood flow. Pathological changes in the vessels, including degenerative lesions and vasospasm are scrutinized in depth together with pitfalls in the interpretation of diagnostic studies.

Section III, dealing with general operative techniques, is of special interest to a neurosurgeon. The author emphasizes the importance of frequently overlooked details of operating room organization and personnel, use of the microscope, proper instrumentation, positioning a patient, and a comfortable position for the operator.

The clear, concise diagrams of operative exposure are explicit and easy to follow. Illustrations and actual photographs of specific steps of exposure and clipping of the aneurysms are of far more value than a direct observation of the procedure would be at the operating table. Once again, frequently encountered problems in exposing and clipping vessels are expertly set forth.

Aneurysm surgery of any kind would be impossible without expert controlled anesthesia. Special techniques to produce brain relaxation are absolute musts in aneurysm surgery. This state is achieved through hyperventilation and the use of hyperosmolar agents permitting access to the basalar regions of the brain, and include methods of controlled hypotension used during the dissection and clipping of an aneurysm while maintaining adequate cerebral perfusion. These strategies are cited in Section IV along with the use of an operating microscope and bipolar coagulation which have led to striking improvement in the outcome of neurological surgery.

Section V on pathology contains everything anyone would ever want to know about cerebral aneurysms, including incidence, classification, distribution, occurrence, association with other vascular anomalies, pathology of formation and rupture and the natural history of ruptured aneurysms. Complications including vasospasm, infarctions, cerebral

edema and hydrocephalus, are thoroughly covered and are lavishly illustrated.

While this book is of special interest to the neurosurgeon, every physician who sees it will be enthralled by the demonstration of an area of anatomy never before so clearly depicted. It is also a valuable reference for any physician called to attend a patient with subarachnoid hemorrhage.

University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104

REVIEW

PERKINS, WILLIAM H., ed. *Stuttering Disorders.* 255 pp. Thieme-Stratton Inc., New York, 1984. Price $14.95

Reviewed by JOHN PAUL BRADY

WHENEVER there are a large number of treatments for a given disorder in medicine or clinical psychology, it is usually the case that none of them are clearly effective for a large percentage of patients. This is certainly true of stuttering, as is illustrated by the present volume describing multiple procedures and programs for the treatment of this perplexing disorder.

As the editor of the volume points out, therapies for stuttering tend to fall into one or two categories that reflect different assumptions about the nature of the disorder. The first group regards fear and avoidance of speech as critical in the development and persistence of stuttering. Accordingly, treatment focuses on the person rather than the speech apparatus and consists largely of counseling or psychotherapy. The second category regards fear and avoidance of speech as understandable consequences rather than causes of stuttering. Therapy consists of one or another technique to help the patient acquire fluency by focusing directly on the production of speech. It is assumed that fear will dissipate and avoidances decrease as the patient gains self-confidence in applying his newly acquired fluency in everyday situations. Most of the specific procedures employed fall into the category of behavior modification techniques with a strong empirical and experimental basis. They include procedures such as delayed auditory feedback, the use of rhythmic stimuli to pace speech, altering the rate of speech and the manner of breathing, rewarding fluent utterances and punishing dysfluent ones, etc.

Exponents of both approaches have their critics. Emphasis on counseling and psychotherapeutic techniques has been dominant in American speech therapy for most of the century. These techniques are frequently, and perhaps properly, criticized for failing to be adequately

Dr. Brady is Kenneth E. Appel Professor of Psychiatry at the University of Pennsylvania.

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rigorous in their approach. Treatments are often poorly described, methods of assessment are inexact, and treatment outcome data are either totally lacking or have inadequate systematic follow-up.

Bringing the tradition of behavior modification therapy to bear on stuttering has partially corrected some of these deficits; that is, there has been more attention to systematic assessement, detailed and reproducible descriptions of the procedures themselves, more effort at systematic follow-up of results, etc. However, the more behaviorally oriented therapies themselves have not always been carried out with sufficient methodological rigor. Thus, as Sheehan and Sheehan point out in an excellent critique of this approach (Chapter 10), reports of improvements have often been overly optimistic. In fact, the reported percentage of improvement has not changed greatly with behavioral techniques over the past twenty years, even though the techniques themselves have changed as some procedures grew out of fashion and others became popular. In addition, Sheehan and Sheehan decry the publication of volumes with titles such as *Stutter-Free Speech* and *Stuttering Solved* which imply a definitive cure where one does not exist.

After reading these generally well-written contributions, one tends to conclude that a variety of useful procedures do exist that can substantially help some patients some of the time. Some are in a psychotherapeutic context and stress the person and others are in a behavior modification context and stress the speech problem. However, no technique or combination of techniques is so effective as to provide the answer to the disorder. This limitation may be related to a third component of the illness that is not addressed in this volume; namely, the role of the physiological factors for which there is some evidence.[1] Although a specific biological basis for stuttering has not been found, the disorder behaves very much like a developmental disability based on some subtle defect in the complex mechanism of producing intelligible verbal language in an easy and fluent manner. The disorder occurs predominantly (three or four to one) in males in all cultures, almost always has its onset at an early age when speech sounds are first being forged into simple sentences, and tends to be difficult to get rid of completely once stuttering has persisted into adolescence or beyond. However, there is a slow but steady rate of recovery, with or without treatment, so that there are fewer stutterers at age twenty than fifteen, fewer at age thirty than twenty, and so forth. It may be that what these various therapies accomplish is to speed up a process of adapting to, or

compensating for, a basic fault in the timing mechanism for ordering speech sounds into fluent verbal communication. The fact that the anticipatory anxiety, which varies in intensity from speaking situation to speaking situation, aggravates the problem is not surprising, just as many physically based defects in complex motor behavior are made worse by such situations. This in no way minimizes the value of present therapies for stuttering or the need to develop new and more effective programs. Rather, we might recognize that the limitations of our therapeutic efforts with severe and chronic stutterers may have to do with largely unidentified biological factors. Research into this dimension of stuttering may provide new approaches to treatment to complement psychosocial and behavioral methods.

1141 Gates Pavilion
Hospital of the University of Pennsylvania
Philadelphia, PA 19104

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REVIEW

CAHILL, KEVIN, ed. *The AIDS Epidemic.* 173 pp. illus. New York: St. Martin's Press, 1983. Price $7.95, paper.

Reviewed by JONATHAN W. M. GOLD

THIS book consists of a series of talks delivered at a symposium held at Lenox Hill Hospital in New York City on a rainy Sunday morning in the spring of 1983. The book was rushed to publication and appeared shortly after the symposium. In the time since its publication, however, our understanding of AIDS has advanced radically. A previously unknown retrovirus called the lymphadenopathy associated virus (LAV) or human T-lymphotropic virus (HTLV-III) has been discovered and established beyond a reasonable doubt to be the etiologic agent of this frightening disease. This discovery enables us to diagnose the disease, understand its transmission, and begin thinking, for the first time, in a truly rational way about treatment and prevention.

One would think that a book such as this one, which deals with a rapidly changing field, would have a high probability of being outdated before it even appeared in bookshops. It is therefore surprising and informative to see how useful and interesting this book still remains. There are a number of reasons why the symposium and book are important. In addition to, and perhaps more important than, its value to physicians and scientists, the symposium was held to inform social and political leaders and society in general about the gravity of AIDS and to arouse them as to the widespread, increasing tragedy it is causing. Dr. Cahill was an adviser to former New York governor Hugh Carey on health affairs and has a long record of interest and involvement in public health policy matters in New York and in third world countries. Although terminally ill, Terence Cardinal Cooke gave an invocation at the meeting, and Mayor Koch appeared. Nonetheless, the adequacy of society's response to such a crisis remains a matter of intense controversy, even despite scientific advances.

Dr. Gold is Associate Director at the Special Microbiology Laboratory, Assistant Attending Physician at the Memorial Sloan-Kettering Cancer Center, and Associate Professor of Clinical Medicine at Cornell University Medical College.

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The acquired immune deficiency syndrome is a terrifying, and apparently new, disease. At the time of the Lenox Hill symposium, 1,339 cases had been reported with 505 fatalities. Since that time the number of cases has continued to increase at an alarming rate. Affected individuals are usually young and at the most productive phases of their lives. They face the grim prospect of wasting away and of being grotesquely distorted by a relentless and incurable illness. Their sufferings are compounded by cruel social pressures, prejudice, and neglect. Frequently, victims lose their jobs and are evicted from their apartments by landlords or former lovers. Some health-care workers are reluctant to care for them, and they are treated like pariahs in some hospitals. Nursing homes will not accept them as patients when they are terminally ill. They may be unable to reveal their plight to family members or other loved ones because they are trying to conceal their homosexuality (although frequently this has already been already suspected and accepted). They are therefore cut off from vital medical, physical, and emotional support in their dying days.

This dreadful disease is fascinating. An arm of the immune system is deleted with surgical precision. The function of that arm is to defend against certain infections and to prevent the development of certain cancers. More specifically, the T-helper lymphocyte is the target of this disease, and all the manifestations of AIDS can be traced to the destruction of these cells. However, a case of AIDS cannot be recognized by measuring the number of these cells. It can be diagnosed only when the complications of their destruction appear. These complications include Kaposi's sarcoma, a previously seldom encountered form of cancer, and a variety of infections that occur rarely, if ever, in healthy individuals, but are common in patients who have immune defects associated with cancer, individuals receiving immunosuppressive drug treatment, and those with congenital immune deficiencies.

Although the scientific information in the book would appear to be outdated because the etiology of AIDS had not yet been determined, it is striking, to me, how much was actually known and how much could be done without knowing the precise cause of the disease. Thus, old-fashioned epidemiology clearly pointed to an infectious agent present in certain secretions as the cause. Knowledge of infectious diseases and immunology strongly hinted that the agent would in some way have to inactivate or destroy T-helper lymphocyte function. The researchers who found the virus knew exactly where to look for it and what it would

do. Before the virus was discovered, adequate safety precautions were devised for health-care personnel and for laboratory workers so that they could care for patients safely and compassionately or do research without danger.

Despite great strides in our understanding of AIDS, made possible by the identification of the etiologic agent and the prospect of specific therapy and modes of prevention, little has changed in our ability to treat or prevent it. There is no treatment, and the only methods of prevention currently available are avoiding sexual contact and transfusion with potentially infectious blood. The diagnosis and treatment of the infectious and neoplastic complications of AIDS have not changed from the overview provided by this book.

Memorial Sloan-Kettering Cancer Center
1275 York Avenue
New York, NY 10021

REVIEW

PETERSDORF, ROBERT G., et al., eds. *Harrison's Principles of Internal Medicine.* 10th ed. 2212 pp., index and appendix, illus. New York: McGraw-Hill, 1983. Price $70.00.

Reviewed by WILLIAM BENNETT BEAN

IF it is possible to gather the myriad of contributors, get them to produce sections or chapters for a book that runs over 2000 pages and has an index of 128 pages, and not just to get each section done, typed, organized, edited, printed, and fitted into a coherent whole, it should be easy to review. Probably very few of the excellent editors and organizers studied each page. I certainly have not. Though there is hardly a thread of history in the book, my own medical experience covers more than half a century. At the University of Virginia we were taught in a series of lectures which came directly out of the second edition of Cecil. It was strictly didactic. We could read ahead and learn exactly what would be brought out. Only later on clinical services did we get the benefit of the personal experience and outlook of our teachers. During the time I was taking medicine, I read over Osler's textbook of the vintage my father had used at Johns Hopkins (Class of 1904). I have continued to use as reference the current versions of Cecil's textbook, Harrison's *Principles*, and A. McGehee Harvey's edition of a distant descendant of Osler's text.

Probably the beginning student would profit more by using Harvey or one of the fine British textbooks. For residents and for reference, Harrison, Cecil, Stein, and several others are so close in quality and largely in format that choice becomes almost idiosyncratic. I have used Petersdorf's continuation of *Harrison's Principles of Internal Medicine* for reference for looking things up for verification. Occasionally in any large text I may wander about at random to brush up on some topic that has advanced almost out of range. Instead of reflecting the focus of one or two institutions, Petersdorf has continued the national and even international flavor by selecting experts wherever they happen to be, although this does not yield an exactly homogeneous presentation.

Dr. Bean is Sir William Osler Professor and Emeritus Professor of Medicine in the Department of Internal Medicine at the University of Iowa Hospitals.

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The illustrations scattered throughout are particularly valuable in skin lesions, though the vascular spider is poor and the Peutz-Jehgers syndrome is barely recognizable even to one familiar with the mucocutaneous lesions. The tables throughout are helpful; the references are mainly to monographs and books. The book has kept up to date in a field where the advance, though erratic, is often spectacular and spectacularly rapid. On the other hand, we must remember Pope's advice "Be not the first by whom the new are tried, Nor yet the last to lay the old aside" (*An Essay on Criticism*). This still holds in most aspects of medicine.

The new *Scientific American Medicine* edited by Rubenstein and Federman seems to be the most successful effort to keep abreast of selected advances in medicine as reflected by the broadly used and deep experience of Harvard and Stanford Medical Schools. Because examinations, generally multiple choice,are so deeply imbedded in the cement foundations of Boards, Specialty Boards, State Boards, or National Boards, continuing education and recertification are increasingly popular. Trial runs are available in Harrison, and in some of the other fine textbooks.

That dazzling and nearly comprehensible change and sometimes advance in electronic communication technologies will put an end to "the book" seems unlikely to me, though innovations may enable one to keep currently informed without getting mired down. The medical community is well served by the abundance of excellent textbooks available. Petersdorf's continuation of the Harrison tradition is eminently successful and a comfort to those trying to catch up as well as those trying to keep up.

Department of Internal Medicine
University of Iowa Hospitals
Iowa City, IA 52242

REVIEW

SHEPARD, THOMAS H. *Catalog of Teratogenic Agents.* 529 pp. Baltimore: Johns Hopkins University Press. Price $35.00.

Reviewed by ALLEN S. GOLDMAN

THIS fourth edition is expanded with more entries of the results of human and animal reports concerning teratogens or nonteratogens. This volume is not as complete concerning the world's literature of teratogens as other catalogs, such as *Teratology and Congenital Malformations* by Lois Weinstein (New York: Plenum Press, 1976. vols. 1–3). Nor does it give as much information as *Drugs as Teratogens* by J. L. Schardein (Cleveland, Ohio:CRC Press, 1976). However, as a separate entity this is a very valuable compilation of a variety of reports of agents that are either teratogens or appear to be nonteratogenic. Another value of this volume is its restraint in taking positions on the teratogenicity of any particular drug or chemical agent. It is useful in beginning a preliminary search of the teratogenicity of a particular drug or chemical. The book should be valuable to those who are interested in drugs and pregnancy.

The Children's Hospital of Philadelphia
34th & Civic Center Boulevard
Philadelphia, PA 19104

Dr. Goldman is Research Professor of Pediatrics and Teratologist in the Section of Teratology, Division of Child Development and Rehabilitation at The Children's Hospital of Philadelphia.

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Burgess Lee Gordon
1892–1984

J. WOODROW SAVACOOL

FULL of years and content in his goal of assisting in the care of his wife, Margaret, until her death a few months earlier, Burgess Lee Gordon died on November 16, 1984, at Cathedral Village in Philadelphia, to which the couple had retired in 1980. A long and varied career, including many travels and a wide circle of acquaintances, preceded his retirement in 1975.

He was born in Spokane, Washington, on April 10, 1892, and developed many interests early in life, which complicated his choice of career. After graduation from Gonzaga College in 1912 he spent a few years studying government and agronomy, but in 1915 he entered medical school and was graduated from Jefferson Medical College in 1919. His internship at Jefferson Medical College Hospital was interrupted by serious illness requiring a period of convalescence, but by this time he had attracted the attention of Dr. Thomas McCrae, who encouraged him to try for residency on Dr. Henry A. Christian's service at Peter Bent Brigham Hospital in Boston. He was accepted and continued at the Brigham from 1921 to 1926. Dr. Christian became a lifelong friend. There Dr. Gordon learned good clinical discipline and had a spirit of investigation instilled that led to a number of research projects. One of these was a study of cardiopulmonary responses of marathon runners, carried out with the collaboration of Dr. Samuel A. Levine. Dr. Gordon was also a teaching fellow at Harvard Medical School from 1923 to 1926.

In 1926 Dr. McCrae invited him to return to Jefferson to become Director of the Department for Diseases of the Chest, succeeding Dr. Elmer H. Funk who required relief from his burgeoning responsibilities. The treatment and control of tuberculosis became his overriding concern, but his interest in administrative problems, other research projects, and teaching all played a role in his busy life. In 1932 he became a visiting physician at the White Haven Sanatorium. During the 1930s he was also successful in developing facilities for thoracic surgery in Jefferson's Chest Department. In addition, at the behest of

Dr. Savacool is Honorary Clinical Associate Professor of Medicine at the Jefferson Medical College of Thomas Jefferson University.

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Dr. Lawrence F. Flick, he also became involved in the Frederick Douglass Hospital. There he provided administrative support and extended the principles of modern management of tuberculosis to the black community.

Dr. Gordon's career was interrupted by military service from 1942 to 1945. Following discharge with the rank of Colonel, he was a consultant to the Surgeon General of the United States Army through 1948. Soon after his return, he supervised the expansion of the Chest Department at Jefferson in a move to a larger building at Broad and Fitzwater Streets, where 120 beds were available. He established a pulmonary laboratory for further research and shortly thereafter he developed a cooperative program for the study of pulmonary diseases of anthracite miners in association with the United Mine Workers. In 1947 he was promoted to Clinical Professor of Medicine at Jefferson.

In 1951 Dr. Gordon resigned his Jefferson duties to become President and Wm. J. Mullen Professor of Medicine at Women's Medical College. Six years later, after numerous changes and new developments there, he accepted the post of Director of Education at the Lovelace Foundation, Albuquerque, New Mexico. In 1960 he joined the American Medical Association as Associate Editor, later being responsible for medical terminology and its adaptation to computers. There he saw the book *Current Medical Terminology* through five revisions.

A prolific writer, Dr. Gordon published 172 medical papers. He was associated with and succeeded Dr. Christian as an editor of *Oxford Medicine.* He revised Hughes' *Practice of Medicine* in 1935 and 1942. He was coeditor of *Clinical Cardiopulmonary Physiology* published in 1969.

Honors included the degree of Doctor of Medical Sciences from Women's Medical College in 1957, presidency of the American College of Chest Physicians (1957–1958) and receipt of its medal in 1962. He was honored by a Doctor of Laws degree from Gonzaga University and received its Alumni Merit Award in 1977. He was a member of the Council of the College of Physicians of Philadelphia from 1954 to 1957, having been elected to the College on January 9, 1928. He was a diplomate of the American Board of Internal Medicine, a member of the Association of American Physicians, the American Society for Clinical Investigation, the American College of Physicians, and local and regional medical societies. From 1958 he held the appointment of Visiting Professor of Medicine at Jefferson Medical College.

Marriage to Frances Giltinan in 1929 ended with her death from tuberculosis in 1931—eight months after the birth of a son, Burgess L. Gordon III, who survives. In 1942, Dr. Gordon married Margaret Huston, who predeceased him on July 4, 1984.

Dr. Gordon's impact on medicine and the institutions he served was always associated with innovation and change. Although he outlived most of his contemporaries, he will be remembered by many students and younger associates who appreciated his open smile and friendly demeanor.

519 Fort Washington Avenue
Fort Washington, PA 19034

ACADEMIA

Items of Interest from Philadelphia Medical Centers

Hahnemann University. A joint program has been established for the diagnosis and management of malignant tumors under the direction of *Perry Black, M.D.* Employing new techniques, attempts will be made to better define tumor margins, the role of monoclonal antibodies in tumor growth and control and radiotherapeutic approaches of value.

The Graduate School Honorary Lecture on February 15 was given by *Floyd Bloom, M.D.*, Director of the Division of Preclinical Neuroscience and Endocrinology of the Scrippe Clinic and Research Foundation. His topic was "The New World of Neurotransmitters."

The Medical College of Pennsylvania. A grant has been given by the American Fund for Alternatives to Animal Research to investigate methods of testing poisonous substances without using laboratory animals. The principal investigator is to be *Joseph Leighton, M.D.*, chairman of the department of pathology.

Janet Kaye, Ph.D. has undertaken an experimental project to test the efficacy of clinical hypnosis as an ajunct to chemotherapy in the control of pain, anxiety and vomiting.

Under the direction of *Janet A. Parker, M.D.*, a program is under way to instruct women at high risk for breast cancer in the early self-detection of a lesion.

Preexisting exchange programs with the University of Bahia (Brazil) and the Faculté Libre de Medicine de Lille (France) have been supplemented by a new affiliation with the Royal Free Hospital School of Medicine of the University of London. Administered by *Andrew B. Beasley, Sc.D.* and assisted by a moderate scholarship fund, the arrangement will permit senior medical students to spend a period of four to six weeks of their usual 36-week rotating period in a foreign institution.

At a seminar on March 23 *Barbara Drinkwater, Ph.D.* and *Dorothy Barbo, M.D.* discussed the role of exercise in deterring the advance of osteoporosis.

Thomas Jefferson University. A Professorship of Opthalmology has been announced, named for *Thomas D. Duane, M.D., Ph.D.*

The Department of Family Medicine has received a grant to conduct a two-year randomized study of the effectiveness of nurses monitoring patients with congestive heart failure under home care.

Frederick B. Wagner, M.D., has been elected President of the Philadelphia Academy of Surgery.

The Bodine Center for Radiation Therapy has been dedicated and is in operation. It will offer high energy X-ray and electron radiation, chemotherapy and treatment under hyperthermia to patients with cancer, and will permit radiation therapy during surgery.

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Robert L. Breckenridge, M.D. has been named President-elect of the College of American Pathologists.

A grant has been received for a project to identify inappropriate timing in the use of health services. The principal investigator is *Joseph S. Gonnella, M.D.*

On Class Day, 1985, the first Prize in Medical Ethics will be awarded to a senior. It is named in honor of *Woodrow Savacool, M.D.*

University of Pennsylvania School of Medicine. The Office of Minority Affairs has appointed *Karen Hamilton, Ph.D.* to serve as its new Assistant Director.

On the basis of a successful series of courses to improve faculty computer skills a grant has been solicited and received to establish a series of projects designed to develop educational programs that will give students a grounding in the use of microcomputers.

A workshop for graduating students attracted forty participants to examine the role, opportunities and approaches of successful teaching.

A series of courses has been organized and is presently functioning to instruct students in all classes in the compassionate and humanistic care of patients. These, conducted with small groups of participants, are concerned with the attitude of students to patients, the links between clinical, social and biomedical disciplines and such aspects of human life as the perception of illness at various stages. A proposed minicourse will deal with such topics as medical literature, occupational hazards and cost-benefit analysis.

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Authors should submit two copies, typed on one side of 8½ x 11 inch paper; all material, including quotations and references, should be double-spaced. A short summary of the paper should also be included. *Transactions & Studies* accepts either footnotes or references, but either must be in accordance with the guidelines in *A Manual of Style* (Chicago: University of Chicago Press, 1969), 12th edition. Prospective authors are encouraged to examine back issues of *Transactions & Studies* to familiarize themselves with the format of the journal.

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Human Organ Replacement — Then and Now

JAMES D. HARDY

It is a signal honor to be invited to deliver the Walter Estell Lee Lecture. It is also a privilege to learn at first hand the truly major advances that have come about in the staffing, clinical facilities, and research resources of the Graduate Hospital, which Doctor Lee served so faithfully and so well for so many years.

The subject of my presentation is "Human Organ Replacement — Then and Now." It has been my deep privilege to grow up professionally with this new field. In fact, I have grown up with *three* new fields of surgical endeavor — arterial surgery, open heart surgery, and organ transplantation. All of these have been interrelated and interdependent.

Transplantation has become a vast sphere of activity. Human organ transplants are now generally accepted as treatment for end-stage disease of the kidney, liver, and heart. And successful allotransplantation of the pancreas, intestine, and lung will surely come.

But it was not always so. I shall look briefly at the past, the present, and the future of human organ replacement. Our work at the University of Mississippi will be used as a unifying theme, but please bear in mind that the conclusions expressed represent not only the work of many in our own laboratories and hospital but also the work of a host of transplant scientists throughout the world.

If the 1940s be looked on as a decade in which surgical physiologists made substantial advances using isotopes and metabolic balance techniques, and if the 1950s be seen as the decade in which open heart and peripheral arterial surgery were developed, the 1960s may be characterized as the decade in which formal and formidable effort was directed toward organ replacement in man.

Based on the Walter Estell Lee Lecture delivered at the Graduate Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, on November 20, 1984.
Dr. Hardy is Professor and Chairman of the Department of Surgery at the University of Mississippi.

The possibility of organ transplantation has challenged men's minds through the ages. It has been written that the ancient Hindus and perhaps the Egyptians employed skin flaps to repair nose defects. John Hunter performed autotransplantation of skin elements in the rooster in the 1700s. And at the turn of this century Carrel and Guthrie reimplanted both kidneys *en bloc* in the cat using vascular anastomoses, with three-week survival of this allograft. For this and related work Carrel received the Nobel Prize in 1912. Thus, it had long been appreciated that a transplant in the same animal (autograft) would survive indefinitely, whereas a transplant from an unrelated member of the same species (allograft, homograft) would be rejected in two or three weeks, with a graft from a different species (xenograft) rejected even more rapidly. Meanwhile, in the mid 19th century, Gregor Mendel had patiently crossed peas to develop the Mendelian laws of genetic inheritance, laws that have generally withstood the test of time. It remained for Medawar and his associates to demonstrate that the host (recipient) distinguished "self" from "nonself" by immunologic processes, and for this work Medawar was awarded the Nobel Prize in 1960.

The degree of genetic disparity between the host and the recipient was shown to determine the degree of immunologic reaction and the rejection rate. In due course, the thymus and lymphocytes were found to represent a mainstay of body immunologic defense mechanisms. Still further, a close relationship between transplantation immunology and cancer immunology was observed. For example, an immunosuppressed animal would accept tumors that represented allografts or even xenografts *(Fig. 1)*. Moreover, an abnormal incidence of spontaneous malignancies developed in immunosuppressed patients.

Transplantation studies were begun in our laboratories shortly after the medical school opened in 1955. These investigations involved the skin and later the kidney, as well as the heart and lung. The kidney work was the first in organ transplantation to be moved into the hospital setting, following the leadership of groups in Boston and Paris.

The Kidney

Approximately 50,000 end-stage kidney disease patients are supported by dialysis in the United States, and perhaps one-fourth of these are candidates for kidney transplantation. Transplantation of the kidney is now such a routine surgical activity in most large medical centers that

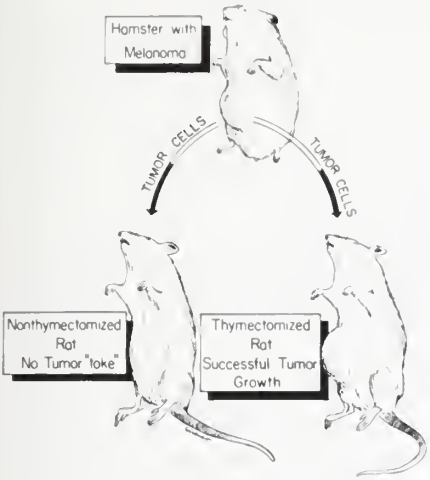


FIGURE 1. Acceptance of tumor xenograft by rat following thymectomy at birth.

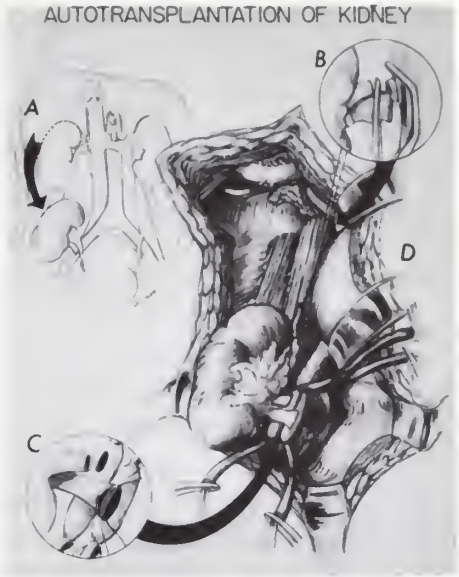


FIGURE 2. Operative technique for autotransplantation of kidney. (JAMA 184:97, 1963. Copyright 1963, American Medical Association. By permission.)

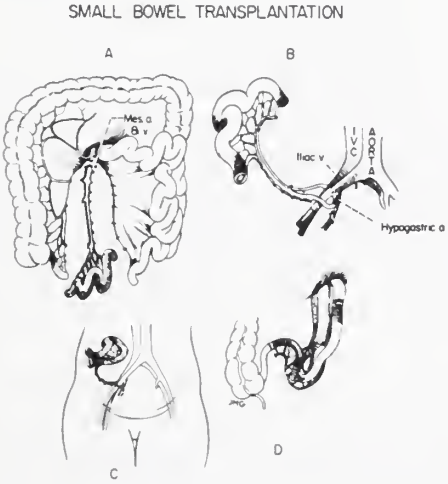


*FIGURE 3. An operative technique for small bowel transplantation. (A) Skeletonization of vascular supply to donor small bowel arcade. (B) Anastomosis of transplant arteries to iliac vessels. (C) Exteriorization of ends of biopsy temporarily, to observe and to biopsy for possible rejection. (D) Insertion of allograft into the recipient's alimentary tract. (*Surgery *56:685, 1964. By permission.)*

here only four special and illustrative experiences will be mentioned.

The first patient was a young dairy farmer referred to us from New Orleans in 1965. After dialysis, he received a kidney transplant from an unrelated living donor who represented a poor tissue match. The mild rejection activity was readily suppressed with appropriate dosage of azathioprine (Imuran) and prednisone. Some months later, without our knowledge, he stopped his immunosuppressive therapy completely, because he felt so well. About a year later he informed us of this and, since renal biopsy disclosed little evidence of rejection, we decided to continue this "experiment" under close observation. Eventually, rejection did begin and we reinstituted the drugs. The transplant served him well for six years of daily activity.

This patient represented, at that time, an amazing immunologic equilibrium, or symbiosis, between the kidney transplant from an unrelated donor and the recipient. This dynamic balance suggested a broad vista of immunologic forces and relationships waiting to be explored in this relatively new field of transplant immunology.

The second patient was a woman who had become so Cushingoid on her steroid therapy, to prevent rejection of the renal allograft, that it was not realized she had become pregnant. All were astonished when she delivered a normal baby boy.

This underscored the fact that normal pregnancy was possible in the immunosuppressed patient.

The third patient thrust on us some of the at times excruciating ethical and moral considerations and decisions that beset early transplantation efforts. For, back then, organ "harvesting" assaulted the psyche. The mere thought of organ transplants from one person to another disturbed many people, and allotransplants were frankly disapproved of by certain religious groups and medical ethicists. "Brain death" had yet to be accepted in most parts of the world, including the United States.

The patient was a teenager who had been stabbed in the heart at school. There had been considerable delay in detecting that a serious injury had occurred and then in transporting the patient to the University Hospital. It was a simple matter to repair the heart wound, but he had been in shock so long before arrival that brain death had occurred. I gently informed his parents (both schoolteachers, as I recall) of the situation and the hopeless prognosis. I then asked if they would allow his kidneys to be transplanted when he died. They talked

between themselves privately and returned to decline my request. Several days later, however, when the boy was clearly terminal, they changed their minds. The father then asked, "Doctor, do you want to know why we refused at first? His mother and I were afraid you would not work as hard with our boy if you were waiting to get his kidneys."

Renal Autotransplantation

As we proceeded with renal allotransplantation, it became clear that a kidney need not be routinely removed after failure of a ureteral anastomosis following injury, or after only a short segment of ureter adjacent to the kidney remained. Why not simply transplant the kidney down to the pelvis, so that the ureteral segment would reach to the bladder? This possibility was not particularly attractive to our urologic colleagues, but in due course a ureter was injured on our own surgical service. Since stricture formation occurred at the anastomosis, and since the opposite kidney had limited function, the affected kidney was autotransplanted uneventfully to the pelvis below *(Fig. 2)*. It functioned well until the patient died of a myocardial infarction several years later.[1] This was apparently the first successful autotransplantation of the kidney, and it was a forerunner of "bench surgery" on the cooled kidney for staghorn calculus and other disorders.

Liver Transplantation

Transplantation of the liver has become a vigorous activity in a few hospitals in several countries. A great many such transplants have been performed successfully in animals in our laboratories, but we have performed only one human transplant. This patient survived two weeks, but died of liver failure, apparently owing to bile duct cholestasis, probably the result of excessive ischemia time during transport of the organ from a distant city.

However, the major work of Thomas Starzl, and of transplant surgeons in other medical centers, has clearly established the value of human liver transplantation. At present, the one-year transplant survival of experienced teams approaches 70 percent, and many patients have already lived for a number of years. After experience had been achieved with liver transplantation for malignant tumors, the indications for liver transplantation were broadened to include terminal cirrhosis, a variety of metabolic diseases, and still other conditions.

Small Bowel Transplantation

Each year not a few patients in the United States suffer mesenteric vascular compromise that results in gangrene of most of the small bowel and often much of the colon. Such ischemia may result from midgut volvulus or abrupt occlusion of the superior mesenteric artery. The patient is commonly left with inadequate intestinal absorptive surface, and at present long-term intravenous alimentation offers the only choice. In fact, we had such a midgut volvulus in a young man who has now been thus sustained with parenteral alimentation for seven years. He works, he married, and now has several children. Nevertheless, successful small bowel transplantation would be far superior to permanent intravenous alimentation.

To date, unfortunately, the few small bowel transplants performed in the world have been notably unsuccessful. This is not because of inadequate technique, for small bowel reimplants or autotransplants are successful in animals, and autotransplants with blood vessel anastomoses have often been successfully used to replace the upper esophagus in man.

A Small Bowel Transplant in Man. Following many small bowel transplants in animals *(Fig. 3),* we transplanted approximately ninety centimeters of small bowel (upper ileum) from a good tissue match mother to her eight-year-old son, who had lost gut from the ligament of Treitz to the cecum from midgut volvulus.[2] The two ends of the transplanted bowel were brought out on the abdominal wall, so that survival of the transplant could be documented before insertion of this gut into his own short but intact alimentary tract. Unfortunately, one week later the patient perforated a duodenal ulcer, perhaps the result of the "short gut syndrome," and at this point, in the presence of the bacterial contamination, the allograft was removed. At this early date it had not been grossly rejected, though microscopic rejection changes were present. The patient had received the usual azathioprine and prednisone as immunosuppressive therapy.

Therefore, while the operative technique of small bowel transplantation has been well established, the fact that the gut contains bacteria at the outset, plus doubtless other factors, presents a still unsolved—but surely not insoluble—problem.

Transplantation of the Pancreas

The need for successful transplantation of the pancreas may exceed

even that of the kidney. There are approximately 5,000,000 diabetics in the United States, and perhaps another 5,000,000 not yet diagnosed. Even meticulous control of the blood sugar level with insulin administration does not prevent the ophthalmologic, renal, vascular, and neurological complications of this disease in many patients. Adequate functioning pancreatic islet tissue is sorely needed. In some experimental animals, certain of the above complications appear to have been reversed by successful pancreas transplants.[3] Isolated but similar experiences have been noted in man.

Pancreatic transplantation in man is still in the experimental stage. Najarian and colleagues[4] at the University of Minnesota have recently reported one hundred human pancreas transplants, probably the most extensive clinical experience in the world. Their success rate has been slowly improving, but at present clinical transplantation of the pancreas remains far behind the success rate for kidney, liver, or heart.

Adrenal Autotransplantation in Cushing's Disease

In 1962, in the course of an operation for recurrent Cushing's disease, it occurred to us that total intraabdominal adrenalectomy might be combined with transplantation of a mass of adrenal gland to the thigh. This thought was derived from the fact that, in the patient being operated on for recurrent Cushing's disease, the nubbin of left adrenal gland that had been left behind at the original operation (attached by only its central vein to the left renal vein) had flopped down caudad to the renal vein and had picked up parasitic arterial blood supply. Why not anastomose one adrenal gland central vein to the proximal end of the divided saphenous vein at the groin *(Fig. 4)*? If the autotransplanted tissue survived and functioned, obligatory lifelong adrenocortical steroid replacement therapy would be avoided, the development of post-adrenalectomy pituitary enlargement (Nelson's syndrome) might be prevented, and the excessive pigmentation that followed adrenalectomy in some patients might not occur. If in the highly unlikely event the transplant were to function excessively and produce recurrent Cushing's syndrome, a portion of the transplant could be readily excised under local anesthesia. This transplantation was then carried out, with permission, in a patient with Cushing's disease who was operated a day or so later. At biopsy, three months later, the transplant remained viable and, most surprisingly, the adrenal vein remained patent. However, in a subsequent patient it thrombosed,

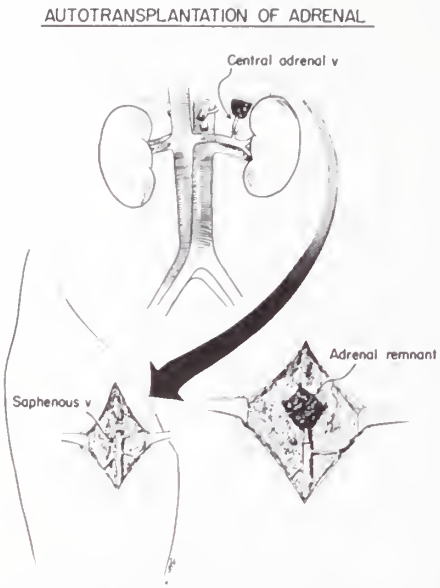


FIGURE 4. Autotransplantation of adrenal. This initial technique of anastomosing the central vein of a segment of excised adrenal gland was later replaced by inserting thin slices of adrenal tissue into pockets fashioned in the sartorius muscle. (JAMA 185:134, 163. Copyright 1963, American Medical Association. By permission.)

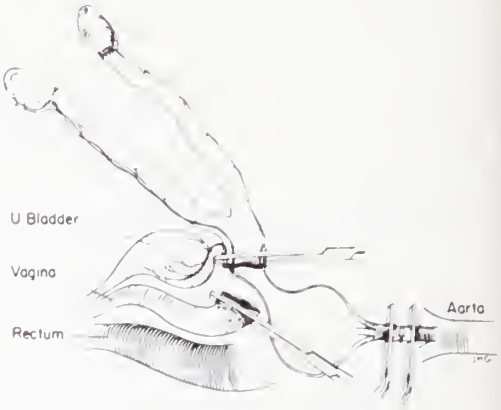


*FIGURE 5. Technique of vascular anastomosis in utero-ovarian reimplantation. (*Arch. Surg. *92:9, 1966. By permission.)*

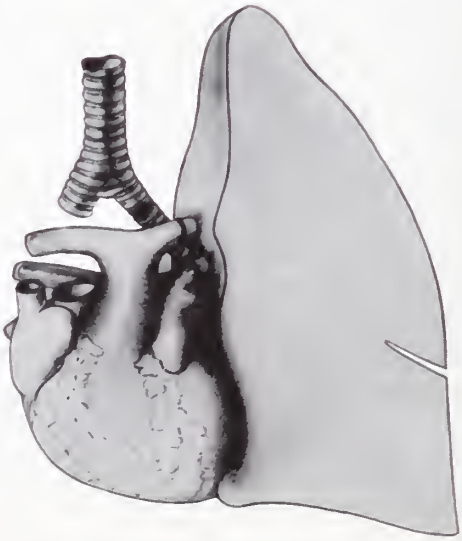


*FIGURE 6. Operative technique employed in transplanting first lung in man. The structures anastomosed included bronchus, pulmonary artery, and superior and inferior pulmonary veins. (*Surgery *56:685, 1964. By permission.)*

and the technique was then altered. Thereafter, slices of adrenal tissue were inserted into sites along the left sartorius muscle. Initially, we believed this to be the first such use of adrenal transplants, but we later found an earlier report by Franksson of Stockholm.[5]

In brief, virtually all the transplants in eight patients survived (biopsy proof) but to varying degrees.[6] Some patients were removed completely from cortical replacement therapy in a matter of months, while others took years, and still others, never. Two patients developed recurrent Cushing's disease, requiring removal of the transplants. Several patients have already exhibited significant pituitary enlargement, two such have had hypophysectomy, and others may require pituitary surgery in the future.

At present, the rather general consensus is that virtually all patients with Cushing's disease have a pituitary tumor at the outset. Our adrenal transplantation did not prevent pituitary enlargement in some patients, nor did it prevent increased skin pigmentation in at least two patients. Therefore, in view of these facts, plus recurrent Cushing's disease in two patients, we now conclude that adrenal autotransplantation offers little clinical value, despite the fact that these grafts do survive and function.

Utero-ovarian Transplants En Bloc

A gynecologist inquired whether or not the uterus could be transplanted. His patient was a young woman who had had an hysterectomy. She had now remarried, and the new husband very much wanted children.

We had not thought of a clinical transplantation, but the request presented a laboratory challenge. After the technique of the small vessel anastomoses had been worked out, a dog's uterus and ovaries were removed *en bloc,* cooled down in iced saline, and then reimplanted[7] *(Fig. 5).* Ten chronic survivors were studied variously by vaginal smear, hysterogram, aortogram, evidence of estrus, and ability to conceive and to deliver. Eight dogs exhibited vaginal epithelial changes reflecting ovarian function, normal ovaries were demonstrated at laparotomy, and two became pregnant and delivered puppies.

This experiment, an autograft (reimplantation), of course avoided the immune barrier that would have confronted an allograft, but it did demonstrate successful utero-ovarian reimplantation. Should a human female still have her own ovaries, and then receive a successful uterine

allotransplant, the genetic composition of the embryo would reflect that of the natural mother and father; if both uterus and ovaries were allotransplanted, the embryo would have derived chromosomes from the natural father but from the donor mother. We have already seen that normal birth can occur in an immunosuppressed mother, but the outcome of the immunosuppressed uterus or ovarian allograft has yet to be determined.

The First Lung Transplantation in Man

There are more than 40,000 deaths from chronic respiratory insufficiency in the United States each year. The majority of these are caused by cigarette smoking and resulting emphysema.

Heart-lung transplants were begun in our laboratory by Webb in 1955, and living animals were achieved the following year.[8] Isolated lung transplantation was begun by Alican and me several years later. Investigations that we eventually published included the following: operative techniques for lung replantation and allotransplantation: cold storage of the organ; rate of regeneration of lung lymphatics (7 to 12 days); function of the reimplanted lung (diminished by 50 percent immediately postoperatively but largely recovered at two weeks); growth of the replanted lung in puppies (lung grew normally in size and respiratory function); return of Hering-Breuer reflex in chronic lung implant dogs (up to four years required for return of innervation); change in right heart and pulmonary arterial pressure in the transplanted animal; treatment of experimental pulmonary hypertension with lung allotransplantation; bilateral lung reimplantation or allotransplantation at the same operation; investigation of light and electron microscopy of the unmodified lung allotransplant; and investigation of a wide variety of modalities to prevent allograft rejection.

After these experimental transplants, involving almost seven years and several hundred animals, Webb and I met with Dean and Vice Chancellor Robert Q. Marston and proposed that we move toward transplantation of a lung in man, should the appropriate clinical, moral, and ethical situation arise. Thereafter, we screened a considerable number of potential recipients over a period of months, but most of these patients were either unacceptable because of other medical conditions or got better on medical therapy or following surgical removal of large pulmonary bullae. However, in June of 1963, a patient with marked and chronic respiratory distress from emphysema *and* a

carcinoma of the left main bronchus presented, and his condition fulfilled the multiple preset conditions: first, he had severe clinical need of the transplant; second, he had a condition (the malignancy) that very likely would eventually prove fatal, regardless of the outcome of the transplant; third, an abscess had developed distal to the high-grade obstruction of the left main bronchus; and fourth, the left lung was involved, for it would be easier technically to transplant a left lung than a right lung. His renal function was borderline.

The fact that this patient was a prisoner at the state penitentiary had no special significance, since the University Hospital cared for all prisoners who could not be managed at the small penitentiary infirmary. The fact that he was white was significant, for there were those who suggested that the patient chosen was black.

A donor died of hypertension and myocardial infarction in the Emergency Room and the family permitted autopsy and lung donation. Both our donor team and the lung insertion team followed the protocols to the letter. Webb and I removed the infected and cancerous left lung without too much difficulty[9] *(Fig. 6)*. The transplant functioned well immediately, as reflected in the left pulmonary arterial and pulmonary venous blood gas values on the operating table.

At death from renal failure approximately three weeks later, there was almost no evidence of allograft rejection. He had received the usual azathioprine and prednisone.

Our published summary[9] was as follows:

> This experience affords justification for several conclusions. First, clinical homotransplantation of a lung is readily accomplished technically. Second, a homotransplanted lung can participate in respiratory support of the recipient. Third, immunologic response in our patient was suppressed with available drugs during the 18 days that the patient survived, though advanced renal disease may have supplemented the effectiveness of these agents. Fourth, experience with this case opens the way to further careful exploration of lung homotransplantation in man.

The donor organ was requested by the Smithsonian Institution, and it was later formally awarded, mounted in a transparent block of plastic.

We performed a second clinical lung transplantation several years later. This patient lived one month, but he died of infection in both lungs and a considerable degree of rejection of the allotransplant.

Clinical single lung transplants now number perhaps forty throughout the world, but the results have been disappointing. No patient has

survived a year, death usually resulting from infection, rejection, bronchial fistula, or bronchial artery hemorrhage.

At present, the most successful clinical lung transplantation has been that achieved at Stanford University with combined heart-lung transplantation as a unit. In due course, however, it is expected that single lung transplantation will improve.

The First Heart Transplant in Man

A number of heart transplants were performed in animals in the late 1940s and early 1950s by various investigators, with brief survival. They used hypothermia and rapid coupling of the vena cavae, the pulmonary veins, the pulmonary artery, and the aorta. Later, however, Lower, Stofer, and Shumway[10] described in 1961 a transatrial transplantation technique that promptly became standard throughout the world.

As noted, Webb[8] began heart-lung transplantation in research in our laboratory in 1955 and achieved early survival in dogs in 1956. He and various associates continued this work, and in early 1963 we joined forces. Here again, Webb and I met with Vice Chancellor Robert Q. Marston and proposed a cautious approach to heart transplantation in man. In the laboratory, one team would prepare the recipient animal on the pump-oxygenator and remove the heart. The other team would remove the heart from the donor animal, cool it quickly, and then insert coronary cannulae for coronary perfusion with cold oxygenated blood while the heart was being sewn into the recipient. However, because of the small size and early branching of the coronary arteries in the dog, we had numerous difficulties in initiating and maintaining coronary perfusion. Actually, we had used only cold arrest for all prior heart transplants, but we felt we would be more secure during the proposed first heart transplant in man if we used coronary artery perfusion, as we were doing for aortic valve surgery in the hospital. Therefore, my team undertook heart transplantation in a series of calves, whose coronary arteries closely approached the dimensions of those in humans. Here we had no problem with catheter insertion into the coronary arteries, but ultimately we found retrograde perfusion through the coronary sinus, using gravity flow, to be even more quickly and easily established and effective.

Since brain death was yet to be accepted, we planned to obtain permission for autopsy and heart donation from relatives of the "brain

dead" donor, and also permission to insert femoral cannulae, so that the moment the heartbeat ceased we could begin cooling the donor immediately, using a pump-oxygenator. Then the cooled heart would be removed and inserted into the prepared and waiting recipient in an adjacent operating room.

Numerous possible recipients were evaluated over the months, but none fulfilled all the preset criteria. Meanwhile, Webb departed to accept the Chair of Cardiothoracic Surgery at Southwestern Medical School at Dallas.

It had become increasingly clear that to have a prospective donor and a prospective recipient die at precisely the same time was highly unlikely. Meanwhile, following the lead of Reemtsma and associates[11] at Tulane University in New Orleans, we had purchased four chimpanzees to serve as kidney donors when no other kidney donor could be found. Reemtsma's group had demonstrated remarkable early success using kidneys of the chimpanzee, the lower primate whose genetic composition corresponds quite closely to that of man.

Finally, in January of 1964, a man in terminal shock from years of hypertension and multiple myocardial infarctions presented. He clearly would die within hours. Meanwhile, a prospective donor with a head injury and "brain dead" remained "alive" on the respirator. In the end, the heart of the largest chimpanzee was transplanted. This primate weighed over 100 pounds and had had a cardiac output of more than four liters per minute under anesthesia. The donor heart was inserted in about forty-five minutes (*Fig. 7*). It beat vigorously immediately on defibrillation and produced a blood pressure of from 90 to 100 mm for one and one-half hours after discontinuation of the pump support.[12] Failure of long-term survival was attributed to the relatively small size of the donor heart and the advanced metabolic deterioration of the recipient. We later showed, in dogs, that the heart of an animal dying of endotoxin or blood loss shock could readily support the host "permanently," if transplanted to the normal metabolic environment of a healthy animal.

The ramifications of this first heart transplant in man* were vast and space does not permit their reexamination here. The conclusions published at that time were as follows[12]:

> A heart transplantation operation in man was preceded by extensive heart transplantation studies in animals. It had been planned to use a

*This organ, too, was requested by the Smithsonian Institution and was later so donated.

OPERATIVE PERMIT

I hereby give full permission for left leg amputation and heart surgery on Boyd Rush. I understand that any clots present will be removed from the heart to stop them from going to still more arteries of his body. I further understand that his heart is in extremely poor condition. If for any unanticipated reason the heart should fail completely during either operation and it should be impossible to start it, I agree to the insertion of a suitable heart transplant if such should be available at the time. I further understand that hundreds of heart transplants have been performed in laboratories throughout the world but that this heart transplant would represent the initial transplant in man.

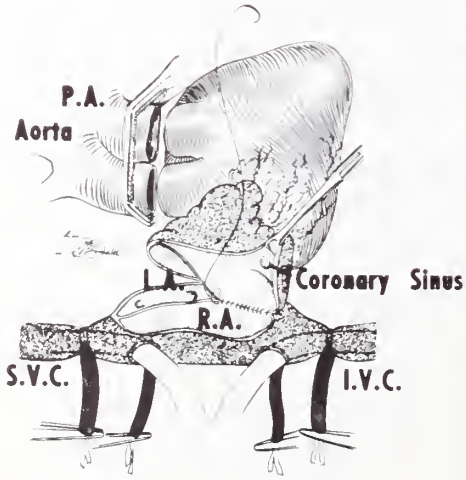
Signed (for family) [illegible] (sister)

Witnessed [illegible]

Witnessed [illegible]

January 23, 1968

FIGURE 7. Transplantation of the first heart in man. (Upper left) The chest x-ray, showing the markedly enlarged native heart of the recipient. (Upper right) Permission for first heart transplant. (Lower left) Operative technique. (Lower right) Transplanted heart in situ. *(Upper left, upper right, and lower left). (*Transpl. Proc. *1:717, 721, 723, 1969. By permission.) (Lower right), (From Hardy, J.D., Human Organ Support and Replacement, 1971. Courtesy of Charles C Thomas, Publisher, Springfield, Illinois.)*



human donor heart, but such an organ was not available at the moment the patient went into terminal collapse due to severe coronary atherosclerosis and hypertensive cardiovascular disease. Thus, the heart of a lower primate was used and inserted orthotopically in approximately 45 minutes.

The donor heart was well preserved during transplantation by retrograde coronary sinus perfusion with cold oxygenated blood. Once the transplant had been rewarmed by blood entering the aorta from the pump oxygenator, it was defibrillated with a single shock. The regular and forceful beat of the transplant was interrupted by pulsus bigeminus which followed the intravenous injection of digoxin. However, this arrhythmia was abolished by increasing the current amplitude of the ventricular pacemaker which had been set at a rate of 100 beats per minute. The donor heart was smaller than the excised recipient heart and gradually became progressively less able to accommodate the large venous return without dilating.

This clinical heart transplantation in a most unusual set of circumstances lies within the established precedents of human transplantation of the nonpaired liver, the clinical transplantation of lower primate kidneys, and the exploration of mechanical ventricular support in a patient with terminal heart failure. Heart transplantation is confronted by the same immunologic barriers which threaten all grafts between genetically dissimilar partners. It is concluded that this experience supports the scientific feasibility of heart transplantation in man.

Since this first heart transplant in man in 1964 and the successful heart transplant by Barnard in 1967, hundreds of clinical heart tranplantations have been performed. The most experienced heart transplant teams achieve about an 80 percent one-year survival, and some heart transplant patients have now lived more than a decade.

The Artificial Heart

The clinical artificial heart insertions at Utah and Kentucky have been much in the news recently. The first total artificial hearts were reported by Kolff and Akutsu in 1958.[13] Later, Tetsuzo Akutsu joined our staff, and he and his ten man team labored mightily for ten years before he took a post elsewhere. They advanced from having every calf die on the operating table, to achieving almost uniform survival for at least one month.

The major complications of the artificial heart are three: clotting on the artificial surfaces, with peripheral embolism; fatigue and breakage of materials, with disastrous hemorrhage or air embolism; or late infection along the air tubes leading out through the chest wall to the pumping console. There is no question that the artificial heart can support the host. Incidentally, the artificial heart provides a fascinating

opportunity for distinguishing between the peripheral vascular, versus the cardiogenic, effects of cardiovascular drugs.

Organ Harvesting, Preservation and Transport, and the Limited Supply

The profound change in attitudes of the American public, wrought by the news media and especially television, has rendered organ allotransplantation not only acceptable but indeed sought after. This has created major concern regarding organ sources, supply, and who shall be selected to receive a transplant—and when. Clearly, the supply of healthy human organs for transplantation has its limits, despite the remarkable improvements in organ preservation and transport. For example, in 1983 the Southeastern Organ Procurement (and matching) Foundation alone harvested approximately 1,600 kidneys, 100 livers, and 66 hearts. We ourselves have shipped several kidneys under cold storage to Great Britain, for successful transplantation, and even one to Turkey. At present, the federal government is funding even more effective harvesting and distribution, so that all appropriate organs can be removed from a given donor and shipped to various transplant centers as needed. For example, the "harvested" heart may go to New York, the liver to Pittsburgh, one kidney to Minnesota, and the other to San Francisco.

The prospective severe shortage of healthy human organs leads again to the possible use of lower primate organs or xenografts. The Baby Fae case at Loma Linda University is a case in point, where the heart of a baboon was recently transplanted into a very young infant. There was no cytological evidence of immediate rejection of the chimpanzee heart we transplanted in 1964. Thus, the future is bright with challenge.

Summary and Conclusions

1. The development of successful human organ transplantation has been surveyed briefly. This remarkable achievement over the past thirty years has been possible especially because of the fusion of advances in immunology and cardiovascular surgery, but because of many other sources as well.

2. The technical, metabolic, and ethical problems met and substantially solved have been truly remarkable. In few other surgical endeavors has a change in the mind-set, the orientation of the general public, been so necessary. For this positive change, much credit must go to an increasing in-

formed and sophisticated presentation of medical science by the public media, especially television.

3. Clinical transplantation of the kidney and the heart has now reached a success rate of approximately 80 percent one-year survival in the most experienced centers. Liver transplantation is not far behind. Moreover, considerable success is being achieved in heart-lungs transplantation as a single unit. Transplantation of the single lung, pancreas, and the intestine remains in the experimental category, but already the success rate of pancreatic transplantation is slowly improving.

The advent of the immunosuppressive drug cyclosporine, to supplement or supplant azathioprine and prednisone, has substantially enhanced the immunosuppresive modalities available. And still more effective agents will surely be discovered.

4. An artificial heart will clearly support life in a patient. Unfortunately, its complications — embolism, fatigue and breakage of materials and late infection along the tubes leading from the artificial heart to the external pumping console — remain.

5. Where early death is threatened by end-stage failure of a single or even several organs, as is often the case, the future of human organ replacement for the extension of life is bright.

School of Medicine
Department of Surgery
University of Mississippi Medical Center
2500 North State Street
Jackson, Mississippi 39216

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New Concepts in the Etiology of Osteoporosis

SOL EPSTEIN

Two advertisements recently appeared in popular journals. One read as follows: "What is more common in older women than heart attacks, strokes and diabetes?" The other advertisement, after stating "The menopause can mean the beginning of serious problems for women," presented a picture of a perimenopausal woman together with an elderly woman who was supposed to be her mother. These displays obviously refer to osteoporosis, which brings me to the title of this report.

What is osteoporosis? Simply stated, the bones of the skeleton become brittle and cannot support the body. But a more precise definition, which will assist in the diagnosis of the condition, is that osteoporosis is a disorder of bone characterized by progressive loss of bone mass until the skeleton is inadequate for mechanical support. In our present state of knowledge of this condition, the chemical composition of the remaining bone is thought to be virtually normal. In other words, no one has, as yet, been able to pinpoint the defect in biochemical makeup of the structural unit of bone that causes osteoporosis. The disorder can occur in patients from forty to ninety years of age. It is divided, according to the usual classification, into two types, to be described in a moment.

Prevalence

Approximately 15 to 20 million persons in the United States are afflicted with osteoporosis. Fifteen percent of postmenopausal white females have osteoporosis; this is a huge number of persons affected. Its 1 to 3 million fractures per year account for 20 percent annual mortality. Its cost runs to 3 to 8 billion dollars annually. This is, therefore, a tremendous economic and social burden for both the healthy and the not so healthy to bear. What is so important about osteoporosis, aside from its frequency, is that fractures occur because of brittle bones. At seventy years of age, half of the people afflicted

Based on a College Night lecture delivered on February 6, 1985, co-sponsored by the Philadelphia Orthopedic Society.

Dr. Epstein is Head, Division of Endocrinology and Metabolism, and Professor of Medicine, Temple University School of Medicine.

will develop spinal compression fractures. Osteoporosis is probably the most common cause of hip fractures in the elderly, with a morbidity/mortality incidence of 40 to 70 percent occurring within one to two years after the fracture.[1] This does not mean that osteoporosis is the direct cause of these deaths. However, when patients become bedridden at this age, they are prone to other diseases, commonly from pulmonary embolism or pneumonia. The elderly are more prone to fractures because they have a decreased bone mass or density that occurs with the aging process[2]; they have failing vision and have muscular weakness because they have less muscle mass, and their coordination is poor, in part owing to cerebellar incoordination. These problems, taken together with a skeleton that cannot support weight, make fractures a serious hazard.

Historical Perspectives

In 1824, Sir Ashley Cooper reported that the bones become thin in their shell in old age. Later, in 1881, Bruns noticed that after the age of fifty, fractures of the hip and wrist are more common in women. From 1881 to 1925, there was little description of the condition in the medical literature. In 1925, Palmer described skeletal conditions resembling osteoporosis; this did include some cases of osteomalacia. In 1926, Owens used the term "senile" osteoporosis, and then, from 1930 to 1940, a new technology was increasingly employed: the X ray. From 1940 to 1960, the Fuller-Albright era entered the scene, and Dr. Albright linked estrogen deficiency to osteoporosis in the female. In 1960, the field of interest had moved to the bone cell, and Harold Frost put forward his basic multicellular unit or the "B.M.U. theory,"[3] which I shall describe later.

There are many factors that may contribute to the disease of osteoporosis. These include a deficiency of dietary calcium,[4] the menopause,[5] the aging process that leads to a decreased bone mass,[2] and the effect of environmental factors such as exercise, smoking, alcohol, and excessive caffeine.[6] Systemic regulation of bone mineral metabolism by hormones, such as parathyroid hormone, calcitonin, and Vitamin D are extremely important, and lastly, there is local regulation of the bone "cell" itself. All these acting in concert may predispose toward thinning of the bone. Recently, Dr. Riggs and colleagues from the Mayo Clinic, on the basis of their studies on the epidemiology of fractures, have described two distinct syndromes of osteoporosis.[5]

Type I is in a female, 51 to 65 years of age (this used to be termed, in the old classification, "postmenopausal osteoporosis"). Type II comprises both males and females 75 years of age (which used to be termed "senile"). Obviously, there is an overlap between the two types, reflecting a combination of Type I and Type II. The characteristics of these are as follows:

Type I (postmenopausal) occurs at about 55 years of age and accounts for the greatest majority of vertebral fractures. It is six times more common in women than in men. Its associated fractures involve trabecular bone (e.g., the vertebral bones of the spine) as well as a mixture of trabecular and cortical bone, such as in Colles' fracture of the wrist. The basic abnormality appears to be an accelerated and disproportionate loss of trabecular bone. Its pathophysiology features a loss of bone, which releases calcium that suppresses the production of parathyroid hormone (PTH) and its biological mediator, cyclic adenosine monophosphate (CAMP). A decreased level of estrogen in the postmenopausal female appears to be the major culprit that allows bone resorption to take place at an accelerated rate.

In Type II the main morbid event is a hip fracture. The male to female ratio is approximately 2:1, and while cortical and trabecular bone is decreased, instead of PTH being suppressed, the underlying pathophysiology is the inability of an aging kidney to produce the active metabolite of Vitamin D, 1, 25-dihydroxyvitamin D, which is mainly responsible for absorption of calcium from the intestine. This leads to a decrease in serum calcium, which in turn increases PTH production and consequently increases bone resorption with loss of bone.

The explanation of the above two syndromes of osteoporosis is not yet proven and remains strictly hypothetical.

To reemphasize some of the age-related factors that influence bone metabolism: with increasing age of the individual, bone mass is lost and bones become thinner, thus predisposing to the syndrome of osteoporosis. In the elderly there are decreased calcium absorption (because of decreased 1, 25-dihydroxyvitamin D) and increased parathyroid hormone levels.[8, 9]

Other factors thought to be involved in the disease are heredity and environment. For example, women of northwestern European descent, who are fair, thin, nonathletic smokers, and who take alcohol and coffee to excess, are all prone to osteoporosis.[1] In addition, if

calcium intake is deficient (and in many of these women nutrition is deficient, because dairy products, which are a great source of calcium, also contain calories, and "skinny is beautiful"), underlying risk factors are increased by inhibiting the intake of dairy products.[4]

A current concern in the etiology of osteoporosis, and one that is becoming increasingly recognized in its prevention, is the role of activity.[6] We have learned that immobilization and weightlessness, as experienced by astronauts, causes rapid loss of calcium. Weight-bearing and gravity act as stimuli to produce new bone, and in their absence bone is lost. Athletes have denser bone than nonathletes, and gymnasts, marathon runners, and tennis players have thicker bones than their nonathletic counterparts. In a study of postmenopausal women, moderate exercise has been shown to increase total body calcium and retard bone loss.[6] Some caution is in order, however, in the matter of excessive running because female athletes, who exercise strenuously and run high mileage in training, tend to become amenorrheic and their bone density is decreased.[10] It thus appears that exercise should be in moderation.

Heredity plays a paradoxical role in osteoporosis, at least as regards race. Peak bone mass of most individuals occurs at thirty-five years of age, and what is intriguing is why the fair, the white race, suffer from osteoporosis more commonly than the blacks. Statistically, black people suffer from osteoporosis and fractures far less than white people. Recently, in collaboration with Dr. Norman Bell,[11] we looked at some of the biochemical aspects of calcium and bone mineral regulation in black and white subjects and found that black subjects have significantly higher parathyroid hormone values than those who are white. This should lead to increased bone resorption and therefore less bone density and a greater tendency to osteoporosis and fractures, but this does not occur. In addition, black subjects have serum 1, 25-Vitamin D values that are higher than those of their white counterparts. These results make no physiological sense. Additional studies have revealed that blacks have less urinary calcium excretion than the whites and that bone Gla protein (osteocalcin BGP), a Vitamin K dependent protein which is synthesized by osteoblasts and a sensitive marker of bone formation, is *decreased* in black subjects. This is contrary to what one would have suspected, since the increased parathyroid hormone secretion, which resorbs bone and increases bone turnover, should lead to *increased* bone Gla protein (BGP) as compared to that of white

individuals. We therefore speculate that, despite increased PTH values, there may be skeletal resistance (as reflected by low bone Gla protein) to the action of PTH and hence decreased bone resorption in the black patients, which may account for their lower incidence of osteoporosis.

Other hormones are important in the regulation of bone metabolism. I have referred to estrogens and PTH previously. Calcitonin, which protects bone from the resorbing effect of PTH, has, in some studies, been shown to decrease and respond less to provocative stimuli in women. Androgens, progesterone, insulin, glucocorticoids, growth hormone, and thyroid hormone all appear to be important in the regulation of bone minerals.

A defect in cellular regulation of bone cells has been proposed by Harold Frost[3]: the concept of a basic multicellular unit (BMU). The idea implies that the action of osteoclasts, osteoblasts, and osteocytes is integrated in a linked or coupled function. Bone is an active process, and resorption, which is carried out by the osteoclasts, in turn stimulates the osteoblast and affects the osteocytes. These processes keep bone, as it were, in dynamic equilibrium. The physiological process that triggers such a cycle is not known, but what is very important is that the systems are linked in normal individuals. In osteoporosis there may be a negative uncoupling. One of the cells may tend to function independently or abnormally from its other linked cell and a negative uncoupling may ensue, such as an increase in resorption *without* a corresponding increase in formation. Or, contrarily, there may be a primary decrease in formation, which results in reduced bone mass and hence osteoporosis.

The role of local agents in regulating bone metabolism is a field of great interest at present. Prostaglandins, osteoclastic-acting substances (which are important in the hypercalcemia of malignancy, such as myeloma), and entities such as epidermal growth factor, may all play important roles in the pathogenesis of bone loss and osteoporosis.

To dwell briefly on the clinical features of osteoporosis, a typical patient is a postmenopausal woman, fifty to seventy years of age, complaining of chronic back pain, who, with the beginning of a dowager's hump, may have lost height and become short-waisted with a protuberant lower abdomen. Accentuated abdominal transverse creases and poor fitting clothes complete the picture. Radiographic findings at this stage usually reveal compression fractures of the vertebrae,

which account for her loss of height, bone pain, and stooping posture.

Differential Diagnosis

The differential diagnosis of osteoporosis or osteopenia (decreased bone density on radiographs) includes: osteomalacia, which in the future will become more prevalent, especially as our population ages with a reduced income and poor nutrition. Hyperparathyroidism, hyperthyroidism, malignancy (especially multiple myeloma), and Cushing's syndrome or disease should be excluded before making a diagnosis of osteoporosis. Routine screening tests should include serum calcium and phosphorus (both of which should be normal in osteoporosis) and serum alkaline phosphatase, an indirect measurement of osteoblast function, which should also be normal unless the patient has sustained a recent fracture. Thoracic and lumbar spine films are usually requested but are relatively noncontributory, because when osteopenia is evident on a radiograph, a patient has already lost 40 percent of his or her bone mass. The Erythrocyte Sedimentation Rate (ESR) is done to exclude multiple myeloma, as is serum protein electrophoresis. A serum T_4 is measured to exclude hyperthyroidism, and a fasting plasma cortisol will exclude Cushing's syndrome or disease.

One critical issue for diagnosis and follow-up of a patient is evaluation of bone density and mass. Noninvasive techniques consist of dual photon absorptiometry, CAT scans, and neutron activation analysis.[12]

Dual photon absorptiometry

This involves the use of a radioisotope that emits photons at two different energy levels and is independent of soft tissue components. Its importance is that it measures the density of cortical and trabecular vertebral bone. In the postmenopausal female, the vertebral spine is the most common site of a classical compression fracture, and for this reason the technique is valuable. The technique requires very little radiation and, while it does not establish a diagnosis, it does allow a physician to follow a patient's course during therapy and, perhaps, to screen out individuals who are at risk for fracture in later years because of their decreased bone density.

Computer tomography

For this technique, a mineral standard is used and computed against the spine under question. Bone mass is expressed as milligrams of the

mineral standard. The radiation dose is higher than dual photon absorptiometry and bone marrow fat may hinder the measurement.

Neutron activation analysis is available in a few centers. Very expensive, it measures not the density of the vertebral bone but total body calcium content, a reflection of bone density. The radiation dose appears to be far greater than in the other two procedures.

Bone Biopsy

An invasive technique for the diagnosis of osteoporosis and other metabolic bone diseases is also available.[13,14] Bone biopsy, performed under local anesthetic with a trephine needle, is probably the most definitive. It is principally reserved for diagnostic and research purposes. The technique requires a skilled bone histomorphometrist in order to make the procedure meaningful. Complications are infrequent, but patients are still reluctant to undergo the procedure. Two doses of Tetracycline are administered prior to a bone biopsy, as Tetracycline stains osteoid tissue and gives a good indication, using histochemical staining, of the rate and degree of mineralization as reflected by the amount of osteoid tissue between the two labels of Tetracycline.

I mentioned earlier the Vitamin K dependent bone protein known as bone Gla protein (BGP), which at our institution is measured by radioimmunoassay.[15] Bone Gla protein accounts for 25 percent of the total noncollagenous protein in adult bone. Bone Gla protein, or BGP, contains three residues of the Vitamin K dependent amino acid, Gamma carboxyglutamate. BGP reflects osteoblastic activity and bone formation. It is elevated in various bone diseases with high turnover rates such as Paget's disease of bone and hyperparathyroidism and is a useful marker for monitoring therapy.

BGP may be also quite a good marker for those at risk for developing osteoporosis. Normal females tend to have higher levels of serum BGP as compared to the males; the increase tends to become most marked at about the time of the menopause. The rise in BGP, which increases with age, correlates with serum levels of parathyroid hormone and also correlates with bone density as measured by photon absorptiometry. With other research groups we have found that BGP is elevated in osteoporosis of the high turnover variety, i.e., in accelerated resorption and formation.

Our present hypothesis for the relationship of age to osteoporosis

is in agreement with the Type II syndrome proposed by Riggs and colleagues. With increasing age the kidney (which is the main site of formation) produces less 1,25-dihydroxyvitamin D (the most potent form of Vitamin D). This decrease results in diminished calcium absorption, which acts as stimulus to PTH secretion. Increased PTH activity causes bone resorption and, according to the B.M.U. theory, stimulates bone formation, bone remodeling, and increased turnover, which releases excess bone Gla protein into the circulation.

Recommended treatment

There is no ideal single therapy known at present for two reasons: Osteoporosis appears to be a heterogenous disorder and we don't know the exact cause of the condition or indications for a correct drug. Treatment includes estrogens, fluoride, calcitonin, 1,25-dihydroxyvitamin D, calcium, anabolic steroids, and parathyroid hormone. As regards the benefits of estrogen therapy in osteoporosis, the greatest potential benefit may be for women who have had an early menopause and a positive family history of osteoporosis. Those who are susceptible are small in stature, fair-complexioned, nulliparous women, who seldom exercise, and who consume insufficient calcium and excessive alcohol and caffeine.[1] Before the use of estrogen is contemplated, its contraindications and risks should be considered. The risk factor that has received the most media attention is estrogen-dependent neoplasia, commonly of the uterus.

Fluoride is another medication of current interest. At this time it has not been approved by the FDA for routine use in the therapy of osteoporosis. Fluoride appears to stimulate new bone growth by way of its action on osteoblasts and perhaps on other mediators of bone mineralization. The rationale for its use has evolved from studies showing that subjects living in high fluoride areas have greater bone density than those living in areas of low fluoridation of water, that high-dose fluoride decreases urinary calcium excretion, and that improvement in bone pain and an increase in bone density have been observed after one year of use. There is no doubt that in certain individuals fluoride therapy works. It does stimulate new bone. The problem is that the new bone may not be normal, and there is a relatively high incidence of side effects, depending on the dose. Therefore, before fluoride can be freely used, more studies are required to establish its optimum dose.[16]

In conclusion, I would like to dwell on the concept of integrating therapy with what has been mentioned about the B.M.U.[5] (the basic multicellular unit). Broadly speaking, that the action of bone cells is coupled, acting in concert, and perhaps, osteoporosis reflects an uncoupling where one of the cells is not in accord with precursors or with bone-forming or bone-resorbing cells. It was proposed, based on this theory, that perhaps intermittent or pulse treatment for osteoporosis may be feasible to restore the cycle (coupling?) or to correct the deficient cell action. This therapeutic regime is referred to as the A.D.F.R. method where A represents activation of the B.M.U.; D, depression; F, a free or rest phase, allowing the osteoblasts to lay down bone; and R, repeat of the therapeutic cycle. It is possible that treatment of osteoporosis in the future may be one of pulse or intermittent therapy aimed at cell types that may be out of cycle rather than just a single continuous drug program. Studies pursuing this concept are already in progress.

Albert Einstein Medical Center,
York and Tabor Roads,
Philadelphia, PA 19141

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When to Write

BETTE D. BORENSTEIN

Historically, physicians have been learned in the arts as well as the sciences. Their contributions to world literature have not been inconsequential. Just as the Russians can boast of their Chekhov, so can the English of their Somerset Maugham and Sir Conan Doyle. While Sigmund Freud did not earn a Nobel prize for his provocative contribution to medicine, he did distinguish himself in German literature by receiving the Goethe Prize for literature. Over the years, several American physicians have displayed a proficiency in the English language. There are some individuals who, having a profound appreciation of good literature, actually prefer the poetry of the American physician William Carlos Williams to that of the sublime John Keats (who also devoted a brief period of time to the study of medicine). All in all, physicians — particularly those of a few years past — may justifiably take pride in the contributions made by members of their profession to world literature. Despite such contributions, however, Sir James Barrie once said, "the Man of Science appears to be the only man who has something to say now — and the only man who does not know how to say it." The validity of that statement perhaps might have been challenged at the moment it was uttered. Nearly fifty years later it has become a stark reality that must be dealt with in educational institutions across the country.

In this brief essay, we are concerned with those literary creations that comprise the vast body of medical and scientific publications. Every day, articles in medicine and the allied health sciences proliferate geometrically. Many such papers and reports are not simply boring; they are unintelligible. In the race to fulfill the dictum of "publish or perish," the most trivial research in both the basic and clinical sciences is reported. The worst of all this is that most contributors simply do not know *how* to say what they have to say. Perhaps the pressures of too many physical science courses and too few courses in the humanities are responsible for this lost ability to communicate.

Dr. Borenstein is Research Associate, Center for Research in Medical Education and Health Care, Jefferson Medical College of Thomas Jefferson University.

Perhaps too little time for reading anything other than medical and science texts has denied the physician the opportunity to develop erudition. There are many "perhapses," but no clear-cut answers.

It is not enough to "know" all that is required of us to practice our respective disciplines. We must be able to communicate what we know, and we must do so in terms understood by those for whom our communication is intended. Our mastery of the language must be sufficient to allow us to communicate on many levels. In addition to possessing a rich vocabulary, a writer should have an intimate knowledge of the prevailing social structure and political milieu. The most direct route to the acquisition of these writing tools is a path illuminated by good literature.

As one who has served a very long preceptorship in editing medical literature, I would like to offer several observations or guidelines that might form the basis for an intelligible and interesting literary offering. Several things must be considered and decided on before writing the first word!

> What is the message to be conveyed?
> Is the message worth the required effort?
> Who will appreciate or benefit from it?
> Which journal will publish it?

While one may begin to write after deciding what there is to say, there are other steps to be taken by the wise author. A realistic evaluation of the worth of the message can save countless hours spent on an article for which there is neither audience nor publisher. Acceptance of a paper often depends on whether the message is new, or if not new, whether the approach is fresh and stimulating to a new audience.

A proper search of the literature must be made to determine whether the essential content of the proposed paper has already been published. New light shed on an old theme can become an important addition to scientific literature. Previously published material, when expanded on, approached from a new vantage point, or substantiated by additional data, may, on occasion, find a willing publisher. The final decision regarding the appropriateness and timeliness of the paper, however, lies with the author.

Once it has been determined that the paper carries a valuable message that will push back the barriers of ignorance, and whether or not

it has been published earlier, it must then be decided who will be interested in the message and how best to reach them. This is a most critical decision for, if the writer misjudges the importance of the message or the audience for which it is intended, he will lose valuable time in preparing and submitting it to inappropriate journals.

Because building one's reputation is a primary reason for publishing, it is natural to seek out the most prestigious journal. While it is true that publishing in such a journal can enhance one's reputation, it is just as true that submitting a manuscript to the most prestigious journal in the author's field will increase the likelihood of rejection. A rejection means lost time—sometimes months! In the meanwhile, an author with a similar experience, but with more realistic goals, will have published the material in another journal, albeit a less celebrated one.

It should be borne in mind that journals vary in scope, format, and topics, even within a scientific discipline or clinical specialty. An experienced colleague is a good source of information, since he/she has quite likely received a few rejections to balance the number of accepted manuscripts. Early selection of the correct journal will determine the style in which footnotes and references are written, and needless revisions with all the attendant dangers of typographical errors and delays can be avoided. Typists and editorial assistants can be kept happy if the journal is selected while the paper is still in the planning stages.

Practitioners and researchers are usually too busy to cope with the vast reading material being produced. It is important, therefore, to tailor the paper to meet the needs of an already overburdened audience. The message should enlighten readers and, at the same time, lift them from tedium and make them glad that they took the time to read the paper.

Clear, succinct writing, aside from testing one's thought processes, will win many admirers among the author's colleagues as well as the gratitude of the editorial staffs charged with the review of the manuscript. It is important to avoid the impulse to impress the editors and the reader with needlessly long reports "substantiated" by tables and graphs that add nothing to a clear, concise statement of fact. Concision is not to be interpreted as laconism. Economy in verbiage should lead to clarity, not away from it. Neither should verbal economy be the product of emotional or intellectual constipation. Adverbs are mar-

velous creatures (when properly leashed), as are adjectives that can make the difference between a dull statement of fact and one that can be tasted and savored by the reader. Because appropriate humor can make the most difficult task more palatable, even scientific endeavors should be presented in as epigrammatic a fashion as possible.

Over the years, manuscripts have been a source of laughter, tears, and frustration. The laughter has been provided most often by poor sentence structure; tears, by the pomposity of an obviously inept writer; and the frustration, from an inability to decode clumsy and prolix writing. All the *faux pas* that have passed over my desk are too numerous to share in this article, but a few have stopped me and my blue pencil cold!

A wonderfully witty and competent scientist who enjoys an excellent international reputation was recently described as possessing "ingenuous research skills." While it is possible for an ingenuous individual to exhibit ingenuity in his ingenious research skills, I find it difficult to accept the concept of naive, artless, or innocent research skills.

The following is a tedious sentence that required a few readings to decode.

"As a recent graduate, I have had the opportunity to reflect upon [the school's] process of medical education from my current roles as an ongoing student, a practicing resident physician, and a teacher of [another medical school's] students as they rotate through the [hospital]."

I believe the author wanted us to know that the years he has spent in residency training and instructing medical students have given him an opportunity to reflect on the educational process he experienced as a medical student.

The naming of institutions, and the use of meaningless adjectives, e.g., "practicing resident," are nothing more or less than dust in the reader's eyes.

The same author went on to say, "Overall, I am pleased to preface my remarks by stating that [the school] has done well in my eyes." I, personally, have always found a tiny speck of dust in my eye to be very painful. Just imagine what the activity of a large institution trying to do well could do!

An article that appeared in a "higher education" publication was entitled "Gain by Blacks in Education Found Eroding." I never discovered just what the gain was eating away at. We, of course, know

that many educational programs are being eroded by the cutbacks in Federal funding. It is a pity that funds are not available for teaching the art of writing to those involved in "higher education."

Lest all appeals to the intellect for brevity fail, we should remember our ecological responsibility. Many trees are sacrificed each year for so many unnecessary words!

Just as the medical profession has become awakened to the need for staging diseases to determine both the timeliness and character of treatment, so must we begin to stage our literary offerings. We must accept responsibility not only for *what* is written, but for how much and how well it is done. Many universities and colleges are presently offering "specialty" courses in scientific writing, and medical schools must also consider teaching writing skills to those who come ill prepared from undergraduate schools.

Students of medicine and science are obliged to learn how to write because their bodies of knowledge have value only when they can be passed on to future generations. Students must be encouraged to read more than the assigned medical texts. They must have the opportunity to evaluate medicine and science against a variety of philosophical backgrounds. Medicine is still an art—an art that cannot be practiced competently without knowledge of socioeconomic factors and politico-philosophical influences.

Those who practice the art of medicine can realize their greatest joy and fullest potential only when they are able to communicate all that they know of their art. Those in the basic sciences must remain cognizant of the fact that scientific research is complete and meaningful only when the results are published in a manner understood by others.

Thomas Jefferson University
Center for Research in Medical
Education and Health Care
11th and Walnut Streets
Philadelphia, PA 19107

REVIEW

HALLPIKE, J. F., ADAMS, C. W. M., and TOURTELLOTTE, W. W., eds. *Multiple Sclerosis. Pathology, Diagnosis and Management.* 667 pp., illus. Baltimore: Williams and Wilkins, 1983. Price $68.00.

Reviewed by GUNTER R. HAASE

"The more things change, the more they stay the same." One is often reminded of this dictum on review of new books in the field of medicine, and multiple sclerosis is a case in point.

Recognized as a specific disease more than 100 years ago, multiple sclerosis is still a puzzle in regard to its epidemiology, its pathogenesis, and, most disturbingly, its treatment and possible prevention. For the neurologist, the books by McAlpine and co-workers (1955 and 1972) were the authoritative references in the English language. Much new knowledge has been gained since 1972, and this is brought together in the new book by Hallpike, Adams, and Tourtellotte.

For a review of the clinical aspects of this puzzling disease, one will still want to have McAlpine's book at hand, but new information with regard to possible viral participation in the disease process and to immunological aspects makes the volume here reviewed a strong competitor for the neurologist's affection.

The book is divided into twenty chapters, with contributors from the United Kingdom, Germany, Australia, and the United States. In the foreword, it is said that "the contributions are intended to be read as individual essays, as well as in relation to the book as a whole." The readership to be addressed includes "practicing neurologists and research workers," and this is reflected in the structure of this volume. From considerations of the molecular biology of myelin and the process of demyelination, it advances to chapters concerning the epidemiology and genetics of multiple sclerosis, and clinical aspects, including electro-diagnostic studies. Anatomical and chemical pathology of the disease are considered elsewhere, including an extensive review of findings in the cerebrospinal fluid.

The possible role of viral infections and immunological aspects

Dr. Haase is Director of the Department of Neurology, Pennsylvania Hospital, and Professor of Neurology, Medical School of the University of Pennsylvania.

receive extensive consideration, including the animal model of experimental allergic encephalomyelitis.

The remaining chapters address the comprehensive management of the patient with multiple sclerosis. Urologic problems, rehabilitation, spinal cord stimulation, and the possible role of myelin basic protein as a "therapeutic probe" receive special attention.

Although there is no consensus yet in understanding the basic biological events in the demyelinating process, advances in these areas are documented in this book. Unfortunately, this progress is not matched by advances in the area of therapy. Steroids, the mainstay of treatment in acute phases of the disease for more than 20 years, are still probably the best we can offer our patients, and they are not capable of influencing the progressive course of the disease.

When twenty-eight persons contribute to a book, one is bound to encounter differences, not only in style but also in the respect paid to scientific data, which may be at variance. The exposition of the available information is fair, and each chapter is concluded with an extensive list of references. Only a few of the references cited were published after 1980, reflecting the time lag in the publishing process, particularly for a multi-authored work.

This risk of possible obsolescence, which is acknowledged by the editors, is most evident in the immunological perspectives, where a great deal of work is being published every year. Illustrations are well chosen and show a good fit with the text, which concludes with an index.

This work is a credit to the craft of making books. Its reading public should include all those designed in the foreword — "practicing neurologists and research workers." It presents the best summary available of all that is known about multiple sclerosis in the mid-1980s.

Department of Neurology
Pennsylvania Hospital
Philadelphia, PA 19107

REVIEW

EVANS, GARY W., ed. *Environmental Stress.* 386 pp. New York: The Cambridge University Press, 1982. Price $34.50, hardcover; $14.95, paper.

Reviewed by HARRY LEVINSON

This volume was sponsored by The Society for the Psychological Study of Social Issues and is intended to represent the best of both theoretical and applied work on environmental stress. According to its foreword, "it offers a conceptual integration of research on stress, reviews what is known about specific environmental stressors—noise, crowding, temperature, and air pollution — and examines stress in a diverse array of specific environments — hospitals, schools, office buildings, and neighborhoods."

As a summary of the state of research findings, it is an important contribution. As a guide to intervention strategies to relieve or ameliorate stress precipitants, it is disappointing. The research base for intervention is much too limited.

Stress is defined broadly as "any situation in which the environmental demands on individuals exceed their abilities to respond." The editor notes that there are six controversies about the stress construct: (1) conceptual convergence between the physiological and psychological models of stress; (2) the relative importance of objective and subjective measures of stressors for health and behavioral outcomes; (3) the influence of coping with reactions to stress; (4) problems in physiological measurement of stress; (5) individual differences in response to stressors; and (6) interrelationships among multiple stressors. All these controversies have a bearing on the limitations of applications that ideally should be derived from these chapters.

Summarizing the work on stress and the environment, Baum, Singer, and Baum observe that some stressors are acute, affecting large numbers of people, and requiring major adaptive responses. Others may be more chronic, but may still tend to be short term, affecting people on an individual basis, and do not require great amounts of adaptive

Dr. Levinson is President, The Levinson Institute, and Clinical Professor of Psychology in the Department of Psychiatry at Harvard Medical School.

energy. They may be regular and prolonged, requiring more adaptive responses over time than other stressors. Perceptions of the degree to which a stressor is seen as being under an individual's control are also important in the appraisal of a threat. There are many mediators of stress ranging from the capacity for coping, which varies among individuals, to attitudes toward the sources of stress. This makes for a complex array of interreacting events that must be examined simultaneously, which few researchers so far have done. As a result, correlations are modest.

When it comes to the effect of noise on behavior and health, psychological factors such as predictability, the ability to control the noise, and the meaning of the noise become particularly important. The more noise interferes with reaching an important goal, the greater the stress reaction.

Bell and Greene conclude that there seems little doubt that temperature influences arousal, comfort, attention, and adaptive capacity. Again, loss of perceived control over the situation may increase the intensity of the stress reaction. The major problem in this area is the need for more precise measurement.

Evans and Jacobs report that, unfortunately, the literature on the relationship of pollution to stress is generally atheoretical and lacks sophisticated methodology. Reliability and validity data are almost entirely absent. Research on health has overconcentrated on drastic, physical outcomes, like mortality or disease.

Epstein concludes that crowding by itself has few effects for humans unless there are other factors such as the dislike of people for each other. Problems created by crowding are more likely to be ameliorated by concerted group action than those arising from noise, heat, or air pollution.

When it comes to looking at the impact of buildings and cities on stress, Zimring points out that there are few longitudinal stress studies: seasonal cycles, daily cycles, and so on. There are broadly defined qualities of environments and broadly defined stress measures, often questionnaire assessments of satisfaction with the workplace or the schoolroom. No well-defined links have been proposed.

The prevention of stress in acute care hospitals is an important factor in the recovery of patients. Shumaker and Reizenstein note that hospitals are tense and stressful for all users, patients and staff alike. Research does *not* play a major role in design decisions. The authors

describe in great and fortunate detail many of the environmental stresses that have an impact on patients, and offer suggestions about how these might be dealt with in formal design of hospitals, hospital rooms, and other facilities.

The subsequent chapter on school environments and stress by Ahrentzen, Jue, Skorpanich, and Evans cites many studies, but comes to inconclusive results. Methodological problems, which include nonrandom assignments of subjects and absence of control groups, together with a heavy overreliance on self-report and standardized achievement tests, simply do not provide a solid enough foundation, according to the authors. Much of the research relies solely on achievement or task performance as outcome measures. Of course, many other factors have an effect on achievement. Other aspects of mental health are not considered.

The same problem occurs with respect to stress in the office environment. Wineman says that direct measurement of occupational stressors in office settings is difficult owing to the subjective nature of the stress response. She notes that there is relatively little field research in this area, and most of that is based largely on self-report.

Like the work site, neighborhoods may promote social interaction, social control, a sense of security and ease, organizational ties, collective identity, or a sense of place in socialization. Taylor argues that, to the extent the physical environment of a neighborhood advances these functions, it reduces stress. In this area there is a wide range of studies, which, however, vary in their emphases. As in the other chapters in this book, the ties between the physical environment and stress-related impacts are mediated by many other variables.

In discussing policy implications of stressor research, DiMento comments that despite the dearth of information on many aspects of environmental stress, links between mental and physical well-being are increasingly appreciated and accepted and that social science analyses are beginning to converge, particularly with greater agreement on the relationships worth exploring. He argues further that contemporary social science research on stress appears to be overly constrained by disciplinary and exclusively academic orientations quite removed from outcomes that public policy can most effectively control. Regulation is easy when addressed to fairly measurable goals such as clean water, he notes, but "helplessness, negative after-effects, attraction — these are not the domain of public action. Concern with

these outcomes is unfamiliar to government policy, and, some may say, ought to be."

One gets the impression from this book that every frustration is stressful and every stressful event has physiological and psychological consequences. There is no undergirding psychological theory about what constitutes stress for the individual human being, thus narrowing the focus of the research to those phenomena that are both clinically and behaviorally demonstrable. What is clearly missing from this social psychological orientation is not only adequate theory about social forces and their combined effects on groups of people, but any relationship to a comprehensive theory of personality. This would permit clinicians to recognize that what students of groups and larger social entities contend is stress, or stressful, is the same as that which the individual psychiatrist or psychologist sees in the consulting room. In short, the studies of environmental stress have a long way to go.

The Levinson Institute
Box 95
Cambridge, MA 02138

REVIEW

STEELE, RUSSELL W., *Immunology for the Practicing Physician.* 284 pp. Norwalk: Appleton-Century Crofts, 1983. Price $25.00

Reviewed by L. JANE McDOWELL and HERBERT C. MANSMANN, Jr.

Dr. Russell W. Steele has contributed his book, *Immunology for the Practicing Physician,* in response to the rapid assimilation of basic science into the clinical practice of primary medicine. He has set out to incorporate new material about immunology into a form that is manageable for the practicing physician, including large amounts of material condensed into tables. In the Introduction, Dr. Steele condenses each chapter into patient management questions and refers the reader to specific tables for the answers to these questions. His goal is not that this book be the ultimate reference, but that the reader will make use of the additional reading offered at the end of each chapter.

The book is roughly divided by chapters into broad areas of concern. Chapter 1, entitled "Clinical Immunology Today," covers the last decade of advances with topics as diverse as the major histocompatibility complex, vaccines, and "immune enhancement." There is only very superficial treatment given to transfer factor and interferon, which are both discussed again in a later chapter. However, he does give a very enlightening explanation of HLA association with disease and an easy to grasp explanation of the statistical calculations involved in relative risk of disease. He also explains the statistical maneuvers involved in predicting paternity by HLA testing.

Chapter 2, "Management of Suspect Immune Deficiency," presents a rational approach to the recognition of a broad spectrum of immunodeficiency states, and to appropriate laboratory diagnoses. Chapter 3, contributed by Dr. Daniel Marmer, discusses many of the flood of newer diagnostic laboratory tests with reference to the degree of appropriateness of each test, an explanation of how it is performed, and an interpretation of results.

Chapter 4, "Allergy," is contributed by Dr. Martin Fiser. Although

Dr. McDowell is Fellow in Allergy and Clinical Immunology and Dr. Mansmann is Professor of Pediatrics at Jefferson Medical College.

constrained by limitation of space, the author is able to give brief but concise discussions of allergic rhinitis, eczema, anaphylaxis, and asthma. Tabular information is again made use of with an excellent differential diagnosis of asthma. There are well-balanced presentations of skin testing, rast testing, and food allergy and a rationale for immunotherapy.

Later chapters deal with an approach to multiple disease states from an immunological point of view. In addition to explanations of the pathophysiological mechanisms of immune complex diseases, autoimmune diseases, and cancer, unexpected detail is also given to disease states less often viewed from an immunological perspective such as burns, alcoholism, and leprosy. There is an excellent discussion of aging and immune function.

One chapter is given over to a discussion of the immunosuppressive drugs with attention paid to site of action, onset and duration of action, and appropriate uses and precautions with each drug. The explanation given for the immunosuppressive effects of the corticosteroids is especially enlightening. Attention is paid to actions not only at a cellular level, but also in relation to various disease states.

If there is a criticism of this book, it is that there are no footnotes. The work primarily contains ideas and concepts now commonly accepted by the scientific community, although Steele acknowledges in his Preface that "certain contributions may be considered controversial." Because this work was not designed as a text for the student of immunology but as a rapid reference for busier practitioners, the author should be excused for this one major flaw. Dr. Steele feels that his book should be a source of stimulation for review of current literature, and we agree.

Taken on these goals and definitions, *Immunology for the Practicing Physician* is a highly recommendable book.

Jefferson Medical College
11th & Walnut Streets
Philadelphia, PA 19107

REVIEW

LEFFERTS, ROBERT. *The Basic Handbook of Grants Management.* 292 pp. New York: Basic Books, 1983. Price $21.95

Reviewed by BARRIE R. CASSILETH

This book tells us that Samuel Morse was the first recipient of a government research grant. In 1842 he was awarded $20,000 to test the feasibility of the telegraph. The author of this handbook does not reveal the process that eventuated in the award, nor are we told whether Samuel Morse managed the funds to the government's satisfaction.

One imagines a fairly straightforward process, involving, say, an application letter describing an idea for communicating over electrical wires by tapping coded messages, and requesting $20,000 for a research assistant, the cost of odds and ends of equipment, and the ability to feed and clothe himself while working on the project. An interesting if improbable idea, someone in Washington might have said, and a check for $20,000 was on its way. At the conclusion of the project, the funding agency had probably read about the success of the telegraph in the *Washington Daily Post,* but maybe Mr. Morse sent them a final report anyway, perhaps with a diagram detailing the finished product.

Mr. Morse did not have to concern himself with indirect cost rates, line item budgets, cost-sharing agreements, progress reports, capital equipment acquisitions, assurance of compliance forms, grant management offices, institutional review boards, OMB circulars, percent time effort documentation, site visits, and so on. But we do.

Few scientists or academic clinicians entered their chosen fields hoping in the process to develop skills as financial or business managers. Indeed, many physicians elected academic medicine not only because they wanted to care for patients or study cell biology but also because they wanted to avoid business-oriented careers. As the demands of academic medicine expand to include the need to support

Dr. Cassileth is Director of Psychosocial Programs of the University of Pennsylvania Cancer Center.

one's research activities, the role of scientist or clinical investigator shifts increasingly to the role of investigator-as-businessman.

Not all of us feel particularly comfortable about the obligation to prepare and pursue grant applications in accordance with a complex set of bureaucratic regulations involving a new vocabulary, a financial and administrative orientation, and substantial amounts of time. But this obligation has become an intrinsic component of contemporary academic medicine.

Robert Lefferts has published a guide to the management of government and foundation grants that is geared to assist recipients of all types of awards. Examples throughout the book refer to training programs for drug and alcohol abuse counselors, demonstration projects for community work with teenagers, surveys of urban economic problems, and a variety of other medical and nonmedical projects. The examples are interesting and instructive and help to enliven a publication that deals with an essentially dry topic.

The Basic Handbook of Grants Management details procedures, regulations, and requirements associated with grants and contracts. The book offers specific suggestions for staff organization and management, maintenance of records, relationships with funding agencies, budget item reallocation, reporting systems, and use of government circulars and guidelines. Sample forms and charts illustrate discussions throughout the text. The chapter on financial management, for example, covers accounting, budgetary control, and reporting, from a section on "The Importance of Financial Management" to "What to do if you are Underspending or Overspending," to detailed examples of budgetary forms and activity reports.

The book concludes with a glossary of terms and 64 pages of useful appendix material, including summaries and excerpts of OMB circulars. As its title indicates, this is a "basic" handbook, most relevant to the relatively inexperienced grant manager. It is likely, however, that even the seasoned award recipient would benefit from some sections of this handbook, and it is a good text to have on hand for reference purposes. The handbook is written in clear and simple language, a special benefit for those of us who must struggle to comprehend some grant-related requirements and regulations.

Hospital of the University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104

Francis J. Braceland
1900–1985

HOWARD P. ROME

When one is asked to pay tribute to the memory of a friend, it is a humbling honor, particularly so since the tribute to him will be included in the archives of an organization membership in which was highly prized among the many others of my friend's long, distinguished professional career. The death of Frank Braceland brings to an end the life of a Philadelphian whose mark was made not only in this country but also throughout the Western world.

Dr. Braceland's earlier years emulate the legendary Horatio Alger's ultimate reward for perseverance. Frank was proud of the fact that he was born and bred in Philadelphia's Brewerytown, where status was achieved literally in that school of hard knocks. This pugilistic experience was far from a regulated sport. From it, he learned the high cost and the stress incurred by both winners and losers in life's battles. He was 26 years old by the time he finished working his way through high school and college. Years later, in 1941, La Salle College acknowledged his success by conferring on him the first of his twelve honorary degrees. Moreover, he served on its Board of Trustees for ten years. He went on to graduate from Jefferson Medical College at the height of the worldwide Depression in 1930. His superior academic performance earned him a two-year internship in the hospital of his alma mater, and his stellar performance in this role won him the coveted position of Chief Resident Physician. Many years later, in testament to his continued successes, it also awarded him the degree of Doctor of Letters in 1965, and membership on the Board of Trustees.

Among the influences that determined the choice of psychiatry as his medical specialty was his association with Dr. Edward A. Strecker, then the Professor of Psychiatry at Jefferson and a Fellow of the College of Physicians. The opportunity to act as a companion to a depressed patient provided an annealing confrontation with the day-

Dr. Rome is Professor of Psychiatry Emeritus, Mayo Graduate School of Medicine.

in-and-day-out psychological stresses painfully endured by persons with this kind of illness. The imprint of the corrosive effects of mental illness remained with him through his entire life.

He applied for, and was accepted for, a psychiatric residency at the Pennsylvania Hospital for Nervous and Mental Diseases. Dr. Thomas Storey Kirkbride's majestic institution was one of West Philadelphia's landmarks. Within its stone walls, Braceland found what the generations of patients and staffs experienced as sanctuary, as the physical embodiment of enduring stability. He grew to love this place. He admired its rich historical heritage, symbolized by such details as its antique furniture and by the Minutes in the handwritten record of the Manager's Monthly Meetings, noting the precise date of the blooming of the majestic magnolia tree that graced its central courtyard. These were the hallmarks of old Quaker Philadelphia. He often spoke poignantly of his wish to work and live there for the rest of his professional life. He was saddened, as were many of us who also knew of its charmed tranquillity, to learn that it, too, in later years gave way to what some see as urban progress.

Dr. Braceland's career, by chance, happened to span a time of great ferment in the practice of psychiatry. His apprenticeship with Drs. Elmer Eyman, Earl D. Bond, Edward A. Strecker, Harold Palmer, and Lauren H. Smith, members of the Senior Faculties of the Departments of Psychiatry in the medical schools of Philadelphia, provided the opportunity to begin biological research in the control of psychiatric symptoms. It was spurred by Dr. Joseph Goldberger's discovery of the cause of pellagra and the spectacular achievement of Professor Julius Wagner-Jauregg's use of malarial fever in the treatment of paresis; the ravages of dementia paralytica in those days were responsible for the admission of fully one-quarter of the patients in mental hospitals. Dr. Braceland, as a resident physician, learned to be adept in the technique of keeping a potent stain of malarial parasites viable by repeated inoculations of infected blood administered to successive leuetic patients. From this dramatic success, it followed that there could be potential benefit from such biological pursuits.

Frank was an omnivorous, albeit critical, reader. Thus, when he learned of the work of a Dr. Cotton at Trenton State Hospital, where patients' teeth, tonsils, prostates, and even colons were removed as putative sites for focal infections, he was skeptical, saying wryly that he saw little to be gained in treating major psychoses by the quasi-

literary/surgical device of making semicolons out of colons.

As an aspiring resident, Frank eagerly sought opportunities to interlard his daily routine of psychotherapeutic sessions with an assigned group of patients and the usual administrative chores that are the lot of all tyro psychiatrists. The congenial atmosphere of the Pennsylvania Hospital encouraged this. Then, too, the time was conducive to anything that implied an advance. Psychiatry was on the move, galvanized by two vastly different currents—psychoanalysis and its variants and, at the opposite theoretical pole, what was coming to be biologically oriented psychiatry. He was intrigued by the opportunity to be involved in this intellectual ferment.

The time was especially propitious for Dr. Braceland. Dr. Alan Gregg, the Medical Director of the Rockefeller Foundation, was catalyzing clinical psychiatry's emergence from its cloistered institutional walls. He implemented this move by the creation of traveling fellowships to the European centers. Braceland was awarded one of these. Dr. Earl Bond helped him make the choice of Zurich over Vienna, for it combined the opportunity to be a part of the staff of Anstalt Burgholzli, one of Europe's oldest and most renowned mental hospitals. In addition, he was enrolled as an analysand in Professor Carl Jung's Analytical Psychology Seminars. These were heady times for a young Philadelphian; Frank made the most of this luxurious *Wanderjahre.*

While in Switzerland, he acquired the patina of a cosmopolite that was to be enriched progressively thereafter. He often looked back on his European experience—especially to his visits with Thomas Mann and the opportunity to meet many of the renowned European psychiatrists in France, Germany, and Austria. His travels opened his eyes to the world outside of Philadelphia and the insulated Pennsylvania Hospital. This psychiatric experience was rounded off by an equally rich and stimulating neurological appointment as a clinical clerk on Dr. Kinnier Wilson's service at the National Hospital, Queens Square, London. While there, drinking great draughts of the best British medicine, and for the nonce being unconcerned about the future, he received from Dr. Earl Bond an invitation to return to the Pennsylvania Hospital as its Clinical Director.

Equipped as he was with the prestige of a European Fellowship at the age of 36, Frank's candidacy for medical academia was complete. His mentors, Drs. Bond, Strecker, Appel, and Palmer, saw to that. Accordingly, his place was reserved, first as an apprentice occupant of

a number of "footstools" in the groves of academe en route to what was destined to be a continuing series of professional chairs. In short order, he was appointed an Instructor in Psychiatry at the University of Pennsylvania Medical School, an Assistant Professor in its Graduate School, and an Associate Professor at the Women's Medical College, a Visiting Lecturer in Abnormal Psychology at Swarthmore College, a Visiting Lecturer in Abnormal Psychology at Villanova College, and a psychiatrist on the staff of seven Philadelphia hospitals.

The next few years were equally heady times. Frank met, wooed, and married a Main Line beauty in a nurse's uniform, Hope Van Gelder Jenkins; became a certified Diplomate in Psychiatry; was an active member of a Naval Reserve Medical Group; was invited to join the private practice at the recently built Institute of the Pennsylvania Hospital; and embarked on what was planned as a progressive elevation in the ranks of Philadelphia psychiatry. His place in that hierarchy was further assured by his election to the august Philadelphia College of Physicians in May of 1937. He received the final accolade when he became chief of a teaching service at the prestigious Philadelphia General Hospital (old Blockley).

At this time he was invited to be Dean of the School of Medicine and Professor of Psychiatry at Loyola University in Chicago. The offer was tempting. He was needed by this struggling Roman Catholic institution and rose to its challenge. At a superficial level, he rationalized his leaving the Institute by recognizing that the Institute was the breeding ground for the exportation of its brand of psychiatry to the hinterlands. However, Hope and Frank, as well as their many friends, found the departure from Phiadelphia a wrenching one.

The medical and university communities of Chicago welcomed them with open arms. Chicago's organized medicine in the years before World War II was, in fact, a loosely knit enclave of independent fiefdoms. Coming from Philadelphia with its own boundary problems, Frank found this state of affairs quite familiar. Before he became a Dean, he had been—and still was—a clinical psychiatrist, accustomed to dealing with resistance in all shapes, forms, and guises. His expertise stood him in good stead. In the relatively brief time he remained in Chicago, he succeeded in leaving his mark. But his long-term plans for Loyola had to give way to a higher priority—World War II.

As a Naval Reserve Officer as well as a Medical School Dean, Frank Braceland was a natural to recruit physicians for the Medical Corps of

the U.S. Navy. Lieutenant Commander Braceland, MC, USNR, was assigned the duties of Special Assistant to the Surgeon General, U.S. Navy, in 1942. His first job was to solicit physicians to volunteer for active duty. Ultimately, the assignment was formalized when he was ordered to report to the Personnel Office of BuMed; this required a move to Washington, D.C. His next formal appearance in Chicago was in 1957 to receive a Doctor of Science Degree from Northwestern University. Later, in 1965, Loyola University honored him with its Stritch Medal.

In Washington, Commander Braceland was beset by ambivalence. He was frustrated by being kept chairborne, figuratively chained to a desk during years of active duty in the Bureau of Medicine and Surgery. On the other hand, when he became Chief of the Neuropsychiatry Branch, he was finally in his element. In retrospect, he saw this assignment as King Henry V saw Agincourt on St. Crispin's Day:

> He which hath no stomach to this fight,
> Let him depart; his passport shall be made,
> And crowns for convoy put into his purse:
> We would not die in that man's company
> That fears his fellowship to die with us.

Frank Braceland and his friends who headed Army, Air Force, Coast Guard, Merchant Marine, and the Public Health Service were responsible for the organization of the nation's psychiatric services during World War II. It was arranged that they meet weekly to accomplish this purpose.

Frank's special contribution to the Naval war effort was the unique accomplishment of humanizing a military organization that prided itself on its tradition of iron men and wooden ships. His approach to old salts of the line — Navy admirals and Marine generals — was pragmatic. If they required, as their motto had it, "To keep as many men at as many guns for as many days as possible," they would have to concede a little expertise to the Neuropsychiatry Branch of BuMed. *Mirable dictu!* They did, and Frank Braceland was authorized to institute what amounted to far-reaching reforms in the selection of personnel in the Naval Training Stations as well as in the care, treatment, and discharge from hospitals of the Navy's psychiatric casualties. His Legion of Merit, awarded in 1945, and his subsequent promotion to the flag rank of Rear Admiral in 1958 are testaments to the acknowledgement by superiors of his meritorious contributions.

As trying as those years were, they actually served as a second apprenticeship at age 46 for what was to follow Frank's discharge from active military duty. Not for long was he without an equally challenging billet. The Mayo Clinic had for years eschewed the creation of a Section of Psychiatry. The reason was said to be that the Doctors Mayo were mindful of the limited facilities available in Rochester, Minnesota. It would impose a too taxing burden on the care needed for medical and surgical patients. However, their successors, recognizing the magnitude of the neuropsychiatric problem, made the necessary arrangements to accommodate medical, surgical, and psychiatric services for its patient population.

Dr. Francis Braceland, now a civilian, was invited to join the staff of the Mayo Clinic as a member of the newly formed Sections of Neurology and Psychiatry. This groundbreaking opportunity allowed him to become settled at last. He and Hope were soon blessed by the arrival of two children — Mary Faith and John Michael. He and the psychiatrists whom he had invited to join him are credited with the pioneer establishment of an inpatient unit in a general hospital, St. Mary's. He also established a consultation service in the outpatient departments of the Mayo Clinic and for the inpatient services in the Clinic's hospitals. In collaboration with the Governor of Minnesota, he established a residency training program for the physicians of its ten state mental hospitals. And his public talks throughout the Upper Midwest rang the bell for mental health. This public service activity was extended to other areas as well, launching another long and illustrious career as a member, officer, national and international consultant, and adviser to a myriad of professional and governmental organizations. At last count, the number he had served over the past 45 years was 184.

In April of 1951, with the Section of Psychiatry well established, he felt privileged to accept the importunings of the Institute of Living, Hartford, Connecticut, to become its Psychiatrist-in-Chief. After a few stormy months the patients, the staff, the City of Hartford, and the State of Connecticut became aware that the Institute was again on the course set by its early 19th-century founder, Dr. Eli Todd, a man of equal probity and national stature.

Coincident with these regional undertakings, Frank Braceland's administrative sagacity ensured his position as the spokesman for the upward surging national movements in Congress for mental health

and the American Psychiatric Association's dynamic role in achieving this. During his long tenure as Director, Secretary, and President of the American Board of Psychiatry and Neurology, Braceland shepherded the growth of current graduate training centers and the resulting certification of hundreds of psychiatrists. His stewardship as an officer and a trustee of a number of national psychiatric associations and societies enhanced the efficiency of their operations. Despite a crowded schedule, Dr. Braceland found time to plead the cause of the financial needs of his own institution at Hartford and the needs of several national and international psychiatric associations.

All of the above too briefly limns a remarkably productive career that spans more than half a century of what he called "labors in the vineyards." These altruistic efforts in behalf of "the least of them" were motivated by his lifelong devotion to what he felt was his religious duty. In acknowledgment of this, Pope Pius XII, in 1951, conferred on him the Knighthood of St. Gregory, the highest lay Roman Catholic order. Subsequently, in 1963, Pope Paul VI elevated him to the honorific ecclesiastical position of Knight Commander.

His wit and facility at turning a phrase made him a requested popular speaker at the retirements of his many friends. Despite his advancing years, he continued producing a prodigious amount of writing in behalf of the proliferating mental health enterprises of which he was a recognized leader. He retained this all-consuming interest and remarkable productivity until his death on February 23, 1985.

He was interred at the National Cemetary at Arlington, Virginia. This was the last honor paid to a devout patriot, a compassionate worker in behalf of the mentally ill, and a true Philadelphia gentleman.

Mayo Clinic
200 First Street S.W.
Rochester, Minnesota 55905

Orville Carrier King
1899–1985

JONATHAN E. RHOADS

Dr. Orville Carrier King died on March 26, 1985 at the age of 85. Born in Curwensville, Pennsylvania, he earned his Bachelor's Degree at the University of Pennsylvania in 1922 and his M.D. at Jefferson Medical College in 1927. He was the beneficiary of one of the old-style two-year rotating internships at the Pennsylvania Hospital, where he continued for the ensuing two years in general surgery. This was some years before the establishment of The American Board of Surgery, but he sat for the examination of that Board after it was established and was certified in 1939.

In the years before World War II he was on the staff of Dr. Walter Estell Lee at the Pennsylvania Hospital. He served with the 52nd Evacuation Hospital (1942–1946) in the South Pacific (The Pennsylvania Hospital Unit) and was mustered out as Lieutenant Colonel. In 1933 Dr. King married Helen McClenahan, the sister of two physicians, Dr. William and Dr. John McClenahan. The couple had no children, and Mrs. King suffered a long and protracted illness, through all of which her husband gave her the most devoted care until her death on November 15, 1975.

Dr. King was a Fellow of the American College of Surgeons and a member of The Philadelphia County Medical Society, The Pennsylvania State Medical Society, and The American Medical Association. He was elected to membership in the Philadelphia Academy of Surgery in 1938 and served on its Council and as Treasurer from 1960 to 1965. He was selected to give the Annual Oration in 1958. He became a member of the College of Physicians of Philadelphia in 1936, and later one of the first members of the American Association for the Surgery of Trauma. He continued on the staff of the Pennsylvania Hospital in successive capacities for nearly 58 years and headed the Department of Surgery as Director from 1957 to 1964. He also served

Dr. Rhoads is Professor of Surgery at the Medical School of the University of Pennsylvania.

as a surgeon to the Presbyterian Hospital, where he was Director from 1952 to 1955. In addition, he was a consultant in surgery at the Home for Incurables and at the Children's Hospital of Philadelphia. He was a longtime member of the Faculty of the University of Pennsylvania, moving from Associate in Surgery to Professor in 1959. In this capacity he supervised the teaching program for medical students assigned by the University of Pennsylvania for instruction in surgery at the Pennsylvania Hospital.

On a personal basis, he achieved great distinction as a teacher and was honored by the residents and members of the Surgical Staff of the Pennsylvania Hospital by the establishment of the Orville C. King Teaching Award, given annually by vote of the staff to one of its members in recognition of meritorious teaching in surgery. In 1977 he was honored with the Jacob Ehrenzeller Award of the Pennsylvania Hospital, named for the first house officer of the hospital.

In his later years Dr. King continued to have an active interest in the Department of Surgery at the Pennsylvania Hospital, attending the annual sessions of the staff and the various dinners held by the Department of Surgery for its residents.

He will be remembered by all who knew him as gentle, yet stalwart; eminently fair in administrative matters; and a concerned and patient teacher of the many young men and women who moved through his department. As a surgeon, he was effective, careful, and always considerate of his patients as persons.

Over his 85 years, he was a steady contributor to the welfare of the many men and women with whom he was associated.

Hospital of the University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104

G. Henry Katz
1893–1985

HOMER C. CURTIS

When Henry Katz died on April 25, 1985 at the age of 91, an important era in Philadelphia psychiatry and psychoanalysis came to an end. He was one of the last survivors of a group of pioneering physicians who turned to the new field of psychiatry in the 1930s. His interest in this fledgling science and profession stemmed from his curiosity and desire to be in the forefront of a developing field. These same motivations had led him first to a successful career as a chemical engineer, during which he had the honor of preparing the gram of radium presented to Madame Curie as a gift from American schoolchildren. Even earlier evidences of this sense of adventure were his running away at age 14 to ship as cabin boy on an Erie Canal boat, and joining the army in 1917 for service in France.

Perhaps his interest in the medical applications of radium catalyzed an already existing interest in medicine, and in 1928 he entered Jefferson Medical College. After graduation in 1932 and an internship at Cooper Hospital in Camden, he began his psychiatric career by affiliating with the Philadelphia Child Guidance Clinic and the Institute of the Pennsylvania Hospital. At the latter institution he became an important force in building a psychiatric training program that produced many of the leaders in American psychiatry over the past fifty years.

Early in his psychiatric career he recognized the significance of the controversial findings of psychoanalysis. True to his spirit of curiosity and adventure, he undertook the study of this new field, commuting to the New York Psychoanalytic Institute from 1935 to 1938. Psychoanalysis became his major professional interest, and he became perhaps the most influential psychoanalyst in the Philadelphia area. One of the first members of the Philadelphia Psychoanalytic Society when it became a constituent society of the American Psychoanalytic Association in 1939, he became a charter member and first president of

Dr. Curtis is Clinical Professor of Psychiatry at Hahnemann Medical College.

the Philadelphia Association for Psychoanalysis in 1949. He held numerous administrative and educational positions in that organization and became Honorary President in 1970, serving in that capacity until his death. On the national scene, he was an active member of the American Psychoanalytic Association and served as Secretary of the Board on Professional Standards from 1951 to 1953. In this position he took a leadership role in setting standards for the training of psychoanalysts in the United States. Recently I had occasion to read through the records of that period of time and was once again struck by the quiet yet persistent way in which he represented the best medical and ethical principles in the setting up of educational and professional standards for psychoanalysts.

Dr. Katz served as Psychiatric Director of the Devereux Foundation for a number of years and as Assistant Professor and Associate Professor of Psychiatry at the University of Pennsylvania Graduate School of Medicine from 1936 until his retirement in 1966. He valued his membership in local medical and psychiatric groups, as well as in the College of Physicians of Philadelphia.

While he published papers on numerous topics, including schizophrenia, homosexuality, the treatment of children, and the technique of psychoanalysis, his greater interest and skill lay in his clinical work and the education of younger clinicians. He was a much sought after supervisor, and many a psychiatric resident and psychoanalytic candidate considered himself fortunate to have him as a supervisor. As with all good teachers, he found his way to the essentials of the clinical and theoretical issues and could present these ideas in simple, concise terms, free of jargon and dogma. In meetings and groups he was not flamboyant or charismatic in the usual sense of that word. Yet he was always at the center of a discussion and was looked to as having the calmest head and the most appropriate answer. As was said of Mr. Roberts in the Broadway play of that name, he was a leader who didn't look around to see if he was being followed.

A memorial service held for Dr. Katz on May 5, 1985 was attended by family members and numerous friends and colleagues from various parts of the country. In the outpouring of shared memories, love, and respect, there was a notable absence of anything heavy or depressing. This would have pleased Henry Katz, who had lived a full, productive, and happy life and whose keen sense of humor left little room for anything grim. Perhaps the most fitting summation of the descriptions

and recollections of Henry Katz given at the memorial service was offered by someone who had not known him personally. After listening to the many stories told by various speakers, he remarked, "Now there is a man I would love to have known!"

111 N. 49th Street
Philadelphia, PA 19139

DEPARTMENT OF RETROSPECTION

The History of Surgical Advances in the Past Fifty Years

W. W. KEEN, M.D.

My first allusion, of course, is to Ambroise Paré, surgeon to five kings of France, whose skill saved his life in 1572 in the massacre of St. Bartholomew. He was the first to use the ligature for bloodvessels instead of the cautery or the boiling pitch to kill the poison in gunshot wounds. This he did because the supply of pitch gave out. He passed a sleepless night, because of his ligatures, but in the morning found the patients on whom he had used it in a far better condition than the others who had been "pitched" and cauterized.

My experience goes back to 1860, when I began my medical studies at the Jefferson.

We knew almost nothing of germs until 1876, when Lister came over to our International Congress of Medicine at the Centennial. I was convinced of the merit of his antiseptic surgery, and on October 1, 1876, as his first disciple in Philadelphia, I introduced the practice at St. Mary's Hospital and have never wavered in my allegiance.

Think of our poverty in resources and equipment! We did have ether (October 16, 1846) and chloroform (December, 1847), but we did not have any clinical thermometers until Sir Clifford Allbutt, of Cambridge, England, invented them in 1867, after the Civil War was over. We had used the ordinary thermometers for a few years, graduated with degrees and used in the axilla. We felt the patient's arm or neck, and, forgetting that our own sense of heat might not be normal, we said "no" or "slight," or "high fever." Think of a mother with several children having no thermometer to decide whether to rout you out of bed or not, and be grateful to Allbutt! Wunderlich published the first book on thermometry in 1868.

Our instrument cases were lined with fine, dust-gathering velvet, and we laid out our instruments on ordinary clean towels with only soap and water for them and for our hands.

Our ligatures were of undisinfected silk. One end was cut short and

Read on December 17, 1926, before a meeting of the Section on Medical History of the College of Physicians of Philadelphia, and reprinted from *Transactions & Studies,* 1926, XLVIII, pp. 356–359.

the other left long to be pulled on gently in four or five days to see if they had rotted loose. The larger vessels were indicated by a knot in the ligature, the largest by two knots. These were not pulled on for a week or so, and often, whenever no clot had been formed in the infected vessel, tearing them away was followed by a rush of blood. This had to be arrested sometimes by a ligature, a little above the divided end; sometimes by a new incision higher up.

Ten days after Gettysburg I was on duty as "Officer of the Day" for twenty-four hours, and during that night I had to arrest secondary hemorrhages five times. I have not seen as many cases of secondary hemorrhage from that date until now, due to Lister.

One of these cases I can never forget. Our hospital, with over 3000 beds, consisted of one-story wooden pavilions built *en echelon* with ventilators at the ridge pole. The bullet (a leaden, unjacketed, large, conical bullet) had entered just above the end of the left clavicle. It had not emerged. Its course — up, down, right or left, or directly backward—was unknown. The hemorrhage was copious, but not *very* copious. The only way to deal with it — for to enlarge the wound always increased the area of infection—was to try to pick up the end of the bleeding vessel by a tenaculum—a sharp hook—and tie it with undisinfected silk, and see if that stopped the bleeding. The only light I had was a square block of wood, with five augur holes bored partly through, and five candles in the holes. To enable me to see better, the holder of the light lowered it a bit, as the candles were rather long. Our general idea of any fluid, like water, was that it evaporated *upward.* The lamp-bearer forgot, or did not know, that ether vapor is heavier than air and falls *downward.* In an instant everything burst into flames; the etherizer flung the cone to his right and the ether bottle (we had no tin carriers in those days) to the left. Fortunately the bottle did not break. I instantly seized a towel and covered the patient's face, to prevent his inhaling the flames, and another to protect the wound. Meantime the hemorrhage continued. In a few minutes order was restored, and a third or fourth attempt with the tenaculum and a ligature controlled the hemorrhage. A number of us learned several good lessons that night.

The hypodermic needle was just beginning to be used. I doubt whether there were half a dozen of them, or half a dozen of thermometers, in the whole Army of the Potomac.

Once — but once only — I saw Gross try the sharpness of his knife

by his finger, and, lifting his foot, he stropped it on his shoe-sole and stripped it clean (?) between his finger and thumb. The same revolving table was used for the cadaver at the lectures on anatomy and for the surgical operations.

We had a small so-called hospital, over a saloon next to the Jefferson, with ten or twelve beds in two rooms, one for men and one for women and children. As serious cases as removal of an upper jaw were sent home by carriage and the clinical assistants attended them there.

When Gross wanted to lecture on suppuration, I heard him regularly say to the orderly: "Hugh, tomorrow I'm to lecture on suppuration. Go to the hospital and get me half a tumblerful of pus," and the pus was always "on tap," even in the little hospital.

An amputation of the breast seldom was expected to heal under a month or more, for infection always was expected. Healing by "first intention" was bragged about for a month or more.

Erysipelas often set in and jeopardized the patient's life.

I often saw Gross and Levis "couch" for cataract, *i.e.,* inserting a needle and pushing the lens down, out of the line of vision, into the vitreous.

We never opened the head, the chest or the abdomen unless they had already been opened by accident.

"Hospital gangrene" — what irony in the adjective! — spread from case to case in the Civil War, with a terrible toll of life. Amputation usually had a mortality of about 40 per cent.

The three days' fight at Gettysburg was seven times less dangerous than a compound fracture of the leg or a major amputation! So dangerous was a compound fracture of the leg that Syme, of Edinburgh, Lister's predecessor and also his father-in-law, advocated amputation above the knee as the less dangerous alternative.

I was the assistant to Dr. Washington L. Atlee, the best ovariotomist of his time, in the late sixties and early seventies. He never operated until compelled to do so by the size of the tumor. He saved only 1 out of 3 cases. Then, in 1876, came the glorious day of emancipation by the antiseptic method! Even that was decried as "only surgical cleanliness" by those who did not realize what surgical cleanliness was. From then on, Lister's method was simplified. The spray was abandoned, for it constantly caused nephritis in the surgeon even more than in the patient, for he was inhaling the spray during several consecutive operations. Today the method is simplicity itself as compared

with the cumbrous ritual of the seventies and eighties.

The rest is modern history. Even so late as 1889, however, when I was elected to the chair of surgery, there was not a single one-volume text-book based on bacteriology for me to recommend to my students as their *vade mecum.* So I said at once: "I will organize one." I selected twelve surgeons from the leading medical schools and I made the thirteenth—as if in bravado!—and in 1892 *The American Text-book of Surgery* was published and was a great success.

I congratulate you, my many friends, on your sumptuous heritage. Remember that you have entered into the heritage which the men of my generation had at first to grope for in the dim darkness, but ever with increasing light, developing into the splendid surgery of today.

See to it that, in your turn, you carry on the torch of learning to a better and brighter day than we have ever known!

ACADEMIA

Items of Interest from Philadelphia Medical Centers

Medical College of Pennsylvania. *Bernard Sigel, M.D.,* has been appointed Chairman of the Department of Surgery. Dr. Sigel is currently Professor of Surgery and Chief of the Division of Biomedical Engineering at the University of Illinois College of Medicine in Chicago.

On July 1 of this year a major Mid-Atlantic Regional Epilepsy Center will be opened under the direction of *Dr. Richard N. Harner* and *Dr. Neil M. Sussman* of the Division of Neurophysiology.

The Philadelphia Award for 1985 has been awarded to *Jennifer Allcock, M.D.,* Clinical Assistant Professor of Pediatrics and Community and Preventative Medicine, for service to the city as founder of Covenant House Health Services in Germantown.

Joseph Leighton, M.D., Professor and Chairman of the Department of Pathology, has been awarded a grant for developing a method of testing poisonous substances without the use of laboratory animals.

The College's Commonwealth Board Award for 1985 has been given to *Anna T. Meadows, M.D.,* Professor of Pediatrics at Children's Hospital, for her contributions to the knowledge of childhood tumors.

The National Board Award for 1985 has been given to *Georgeanna S. Jones, M.D.,* who, with her husband, *Howard W. Jones, M.D.,* performed the first human *in vitro* fertilization in the United States.

Harris R. Clearfield, M.D., has been named interim chairman of the Department of Medicine.

Temple University Health Sciences Center. The Nutrition Center of Temple University Hospital's Department of Dietetics now offers individualized advice on nutrition to nursing homes, community groups, and centers for the elderly.

University of Pennsylvania School of Medicine. A grant has been received to enable a minority physician to pursue a career in academic medicine and biomedical research. *Ernest Carter, M.D.,* is the recipient of this year's award.

Saul Winegrad, M.D., Professor of Physiology, has been appointed Director of Biomedical Graduate Studies.

The Hospital of the University of Pennsylvania has installed a kidney lithotripter, among the first in the Mid-Atlantic region. The device, of

German manufacture, dissolves kidney stones by means of underwater shock waves.

The Lupus Foundation of Philadelphia has elected as its chairman *Eric G. Neilson, M.D.*

The 1984–85 Teaching Award for excellence has been given to *Mancy Storz, Ed.D.*

Stanley Baum, M.D., Professor and Chairman of the Department of Radiology, has been elected to the Institute of Medicine of the National Academy of Sciences.

Under the codirection of *Paul D. Stolley, M.D.,* the Clinical Epidemiology Unit offers the nation's first training program in epidemiology for third-world doctors.

Seymour S. Kety, M.D., and *Michael S. Brown, M.D.,* are recipients of this year's Distinguished Graduate Awards.

The Society for Investigative Dermatology has honored *Herman Beerman, M.D.,* with this year's Stephen Rothman Memorial Award.

Thomas Jefferson University. Emergency transportation of sick and injured patients by helicopter has now been arranged through JEFF Air, with landing facilities at a heliport atop the Foerderer Pavilion.

Errata

We note with regret that the photograph in Figure 12 on page 92 of the June 1985 issue of *Transactions & Studies* is not of Dr. Cushing but of Dr. Thomas B. Futcher.

The sentence beginning at the foot of page 81 and continuing at the top of page 82 should read: "He had a wonderful time as a Yale undergraduate, achieving election to Scroll and Key (a matter of considerable importance to him), and, despite his father's vigorous injunctions against drinking, smoking and consorting with those of easy virtue, and above all, engaging in intercollegiate athletics, securing also the shortstop position on the Yale baseball team."

The Editor

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CONTRIBUTORS TO THIS ISSUE

SIR JAMES WATT, KBE, MD, MS, FRCS, is President of the Royal Society of Medicine, London.

GEORGE POSTE, D.V.M., Ph.D., is Director of Research and Development, Smith Kline and French Laboratories, and Research Professor, Department of Pathology and Laboratory Medicine, University of Pennsylvania.

JOHN F. SHERMAN, Ph.D., is Vice President, American Association of Medical Colleges, Washington, D.C.

GUSTAVO C. ROMÁN, M.D., is Associate Professor of Neurology, Texas Tech University Health Sciences Center, School of Medicine, Lubbock, Texas.

AUDREY B. DAVIS, Ph.D., is Curator, Medical Sciences Division, National Museum of American History, Smithsonian Institution, Washington, D.C.

SUSAN H. BRAY, M.D., is Director of the Chestnut Hill, Pa. Dialysis Center.

JONATHAN E. RHOADS, M.D., is Professor of Surgery, Medical School of the University of Pennsylvania.

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Commodore Anson's Circumnavigation (1740–1744) The Bequests of Disaster at Sea

JAMES WATT

In the year 1738, Robert Jenkins, an English master mariner, described to a House of Commons committee how his ship, the *Rebecca,* was boarded from a Spanish *guardacostas* in West Indian waters. Her commander plundered Jenkins's cargo, physically assaulted him and tore off his ear, which, it is said, he produced for inspection.[1] It was just the evidence needed by press and opposition to whip up popular indignation against Spain and to demand satisfaction for a series of violent actions against British shipping, which the merchants of London, Bristol and Liverpool declared had contravened existing treaties. They were referring chiefly to the Asiento Treaty of 1713, following the War of Spanish Succession, which allowed British entrepreneurs a foothold in the slave trade to the Spanish West Indies and one ship of 500 tons to carry British manufactures, once a year, to fairs at Portobello and Veracruz. The fact that British merchants constantly abused this privilege and deceived the Spanish authorities was conveniently ignored.

When war appeared inevitable in 1739, despite the reluctance of Sir Robert Walpole to embark on a costly campaign, arrangements were made to use the Navy to seize or blockade the Spanish merchant fleet in its home ports, to interrupt essential communications between Spain and her colonies, and to disrupt Spanish trade by capturing her shipping and bombarding her ports in the Caribbean and in South America.[2] The main thrust was to be made against Spanish possessions in the Caribbean, to which intent Admiral Edward Vernon arrived in Jamaica with a force of nine warships on 23 October. On that day Britain declared war on Spain[3] and planned a diversionary expedition to attack Spanish possessions on the Pacific seaboard of South America and to capture the immensely rich treasure galleon on its annual sailing from the Mexican port of Acapulco to Manila in the Philippines and, it was hoped, to link up with Vernon and Wentworth from the West Indies in an attack on Panama.

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The Ships

George Anson, captain of the *Centurion,* a 60-gun ship with a complement of 400 men, which had been protecting British merchant shipping in the Caribbean, was appointed Commodore of the task force, which included, in addition to the *Centurion*, five other warships and two merchant "pinks"—narrow-sterned supply vessels—for victualing the squadron. The warships included the *Gloucester,* with 50 guns and a complement of 300 men (Captain Richard Norris); *Severn,* of comparable size (Captain the Honorable Edward Legge); *Pearl,* a 40-gun ship with 250 men (Captain Matthew Mitchel); *Wager,* a converted storeship with 28 guns and 160 men (Captain Dandy Kidd); and the *Tryal,* a sloop, carrying 8 guns and 100 men (Commander the Honorable John Murray). The two victualers were *Industry* (400 tons) and *Anna* (200 tons), commanded by their master mariners. Marines and a land force of 500 soldiers were to accompany the fleet.[4]

The Men

Anson, then 43 years of age, had been personally selected by Sir Charles Wager, First Lord of the Admiralty, and proved to be the ideal man for the task. He coped deftly with frustrations and delays caused by ministerial incompetence, which robbed the expedition of an essential element of surprise, and he provided the authority, courage, initiative and resolution to triumph over disease and disaster. In the end he accomplished his mission with an éclat so resounding that it awakened in English hearts the dream of Pacific exploration, eventually realized in the circumnavigations of the illustrious Cook and his successors.

Anson (Fig. 1) was born at Shugborough Manor in Staffordshire on 23 April 1697 and was sent to sea as a boy under influential patronage secured through his aunt, who had married Sir Thomas Parker, later the Earl of Macclesfield. By the age of 25 Anson had become a commander and was rapidly promoted to post captain in command of the *Scarborough,* patrolling the coast of South Carolina. Here he began his long association with America by buying extensive land in the area and by founding the town of Anson in Anson County,[5] now probably Ansonville, just over the border, in North Carolina. He returned repeatedly to the Carolina coast, finally as captain of the *Centurion,* before returning to England in July 1739 for the proposed expedition to the South Seas.

FIGURE 1. Portrait of Admiral Lord Anson in 1744, by Francis Coates. From the collection of The Museum of Staffordshire Life, Shugborough.

Although war had been declared in October 1739 and plans had been discussed for several months, Anson's orders were not drafted by Wager until December. Signed by the King on 31 January 1740, they were not handed to Anson until June of that year, giving the Spanish ample time to inform themselves about the expedition and to take countermeasures. These included sending a powerful force of six warships and a regiment of infantry under Admiral Joseph Pizarro, with orders to intercept and destroy Anson's squadron and reinforce coastal garrisons in the South Seas. Pizarro was given the "flower of the Spanish Navy" for his enterprise,[6] while Admiralty ineptitude deemed it sufficient to provide Anson with men of the most wretched type, landlubbers caught by the press-gang or released from prison. Finding himself still 300 sailors short of complement, his appeal for a full quota brought only 170 men, of whom 32 were hospital convalescents and 98 were marines. His "soldiers" turned out to be Chelsea pensioners (Fig. 2), many suffering from the sequelae of old wounds or chronic illness. Several were over 70 years of age.[7] All who had strength to run

FIGURE 2. Navy and Army pensioners. Lithograph, 1901. From the Wellcome Museum of the History of Medicine.

deserted before reaching the ships, and only 259 miserable specimens actually arrived. To meet the deficiency, he was given 210 marines, who proved to be raw recruits, untrained and undisciplined. When Anson protested, the First Lord of the Admiralty was told by the government that people who were much better judges than he or Anson "thought invalids the best seasoned and properest sort of troops."[8] That was not all. The ships were badly fitted out and disgracefully provisioned. The Duke of Newcastle was the Minister involved, but Wager, First Lord of the Admiralty, was responsible for the appalling conditions obtaining in the squadron. Despite his own personal experience of the value of oranges and lemons in scurvy, no antiscorbutics were carried. However, it is only fair to observe that Lloyd[9] has pointed out the enormous demands made on the Navy by the war. It had 85 ships and 15,628 men in January 1739, when war threatened, and by April 1740, only five months after war had been declared, 190 ships were in commission and a work force of 51,281 men.[9]

The Voyage

When Anson's fleet sailed from Portsmouth in September 1740, its motley, ill-clad crews, numbering almost 2,000 men, were alive with lice, and the overcrowded ships swarmed with rats. They called at Madeira for refreshments, where Captain Norris of the *Gloucester* persuaded his surgeon to recommend his return to England on very

questionable health grounds. The friendly Portuguese warned Anson that Pizarro's squadron had been seen in the offing. In fact, it had just sailed for the River Plate. During the Atlantic crossing to the island of Santa Catarina, off the coast of Brazil, a plague of flies infested the ships.[10] Dysentery followed and high fever, probably caused by typhus. Moreover, the storeship *Industry* had left the squadron after distributing her cargo among the various ships, adding to the problems of overcrowding by encroaching on vital space and bringing the ships so low in the water that the lowest gunports could not be opened for ventilation.[11] Thomas Waller, the senior surgeon, and his friend, the purser, developed cerebral symptoms and died. On arrival in Brazil, 60 of the worst cases were landed and nursed under the supervision of Thomas Etterick, surgeon of the *Wager,* who had succeeded Waller. *Centurion* and *Severn* suffered most from the epidemic and, before leaving Santa Catarina on 18 January 1741, had lost some 75 sailors, marines and invalids. The latter were usually the first to die. At the anchorage, men were bitten by mosquitoes, and malaria added to the loss of life.[12]

The Portuguese governor was not the ally they had expected. Although fruit, vegetables and meat abounded, and there was a surfeit of oranges and lemons, he sought to conceal these foods from the stricken voyagers and secretly sent precise details of Anson's ships and the state of his men to Pizarro, lying in wait at the River Plate.[13]

Cape Horn

Storms and thick fog beset the passage to San Julian in Patagonia. *Tryal* lost her mainmast; and *Pearl,* her captain, Dandy Kidd, who died from cerebral malaria. She also lost the squadron and was almost taken by Pizarro, whose flagship was disguised to look like *Centurion;* however, the quick thinking and expert seamanship of *Pearl*'s first lieutenant saved the day.[14] By this time, fevers prevailed throughout the fleet, several senior officers were sick and captains had been replaced by less experienced subordinates. For instance, Anson's first lieutenant, David Cheap, was first given command of the *Tryal,* then moved to the *Wager,* and Saunders, a lieutenant of the *Centurion,* was appointed to succeed him. Before he could do so, he was suddenly struck down by fever and the surgeons would not allow him to be moved.[15] It therefore fell to Saumarez, second lieutenant of *Centurion,* to take the little sloop around Cape Horn, where westerly gales and mountainous

seas battered the squadron, while men, covered with lice and struck down by scurvy and dysentery, struggled to survive on flooded decks or in sodden hammocks.

Richard Walter, *Centurion*'s chaplain, who collaborated with Anson and Benjamin Robbins in writing an account of the voyage,[16] described the features of scurvy in vivid detail: putrid bleeding gums, loose teeth, petechial haemorrhages, large dark blotches, jaundice, stiff and swollen limbs, the reopening of old wounds, dissolution of callus in healed fractures, indolent ulcers with luxuriant granulation tissue, shivering, depression, unaccountable terrors, syncope and sudden death on the least exertion.[17] He also described "pleurisy," which was actually the pain of subperiosteal or costochondral haemorrhages.

By 14 April only the captain, lieutenant, purser and surgeon of the sloop *Tryal* remained fit enough to work the ship with the help of two boys, for the crew had been reduced to eating biscuits, toasted over brandy to kill the weevils and maggots. The company had surrendered to overwhelming lassitude.[18] Saumarez, her captain, described "asthma, idiocy and convulsions" among other symptoms and attributed scurvy to the absence of a "je ne sais quoi" found only in fresh vegetables and fruit.[19] Saumarez himself was affected, judging by the rambling, somewhat incoherent and brooding letter he sent to Anson on his arrival at the islands of Juan Fernandez.

It is evident that multiple vitamin deficiencies prevailed, for "John Phillips"—the pseudonym of a junior officer, who was probably a surgeon's mate—describes the neurological features of now familiar vitamin B deficiency syndromes in the *Gloucester,* where rats gnawed the faces, eyes and limbs of the dead and swarmed over the living in their hammocks, who, he says, "through the force of their distemper were almost insensitive to pain [and] had part of their toes eaten off as they lay there." Some showed mental symptoms.[20] Mitchel, the captain, was dangerously ill,[21] and Wallbank, the surgeon, lost his two mates.[22] That was not the end of suffering. Many of the squadron's sailors had bartered their clothes for curiosities at Santa Catarina, and hypothermia and frostbite,[23] caused by bare feet on icy decks or by manning the yards in blizzards, added to their misery.

H.M.S. *Severn and* H.M.S. *Pearl*

Severn and *Pearl* were now observed to be falling farther astern, for Pearl's stricken survivors, overcome by weakness and depression, could

not be persuaded to go aloft,[24] and Murray, her captain, urged Legge, his senior in the *Severn,* to abandon Anson in his attempt to round the Horn and to turn back to Rio. Legge needed little persuasion, for dysentery, manifested by fever, vomiting and diarrhoea, had added a fearsome new dimension to the toll of scurvy on board *Severn.*[25] On April 17, the two ships altered course for Rio de Janeiro, and there is a significant deletion in *Severn*'s log on that date. In fact, nutritional disorders had affected the judgment of the two captains, for no sooner had they recovered in Rio than Murray, who had instigated the scheme to abandon Anson, could scarcely be dissuaded by Legge from a further attempt to round the Horn with an unseaworthy vessel and a depleted and convalescent crew.[26]

H.M.S. *Wager*

Meanwhile, the scurvy-ridden *Wager* was in a parlous state. Most of the 132 marines substituting for seamen were dead. Cheap, her captain, was confined to his cabin with scurvy and a dislocated shoulder. Her master,* at the wheel, was suffering from vitamin A deficiency and unable to see the lights of the *Centurion* ahead, though they were plainly visible to others.[27] The ships parted company during the night, with Cheap, insisting on commanding the *Wager* from his sickbed, obstinately refusing to heed his officers' warnings of a lee shore.[28] It led inevitably to her shipwreck on the rocky, inhospitable shore of "Wager Island" on the Patagonian coast, now the Gulf of Peñas, Chile, for only six men could be mustered to try to avert disaster. Here, Cheap's continuing ill-health, superimposed on his intransigence and his irascible nature, caused him to act precipitately in shooting a truculent but unarmed midshipman (Fig. 3) through the head, thus forfeiting his authority and driving to mutiny the starving survivors, subsisting at the time on rats, shellfish and an occasional dog.[29]

Eighty escaped in the longboat and launch, under the command of the gunner, John Bulkeley, who alone demonstrated the qualities of leadership and resolution the situation demanded, and 33 eventually

* The master of the ship was a Warrant Officer, wholly responsible for the navigation. This custom dated from medieval times when the King commissioned merchant ships to fight his wars. A captain and officers — his lieutenants — were then put in command, but the master continued to sail the ship until almost the end of the eighteenth century. In action a captain might say to the master, "Lay me alongside the enemy," after which the captain would direct the firing. The fact that the master was at the wheel shows how critical the situation was. (Author's note)

FIGURE 3. Captain Cheap shooting Midshipman Cozins after the wreck of the Wager. *Rare print from a sketch by a survivor. From the log of the* Centurion,[13] *1773.*

reached England after a harrowing voyage through the Magellan Strait to Brazil's Rio Grande, a journey of 2,000 miles. Another 20, accompanying the captain in an abortive attempt to sail north from the Gulf of Peñas, included Elliot, the surgeon, who died from scurvy, and the Honorable John Byron ("Foulweather Jack"), then a midshipman and later grandfather of the poet. By this time Cheap had lost all self-respect. His legs were "as big as mill posts, though his body appeared to be nothing but skin and bone."[30] Covered with filth and vermin, he resembled a human anthill. His memory gone, he failed even to recall his own name and lapsed into a stumbling, passive state, displaying all the features of advanced vitamin B and C deficiency syndromes. Yet ironically, it was on this starvation trek that Byron recorded the first description of hypervitaminosis A for, after being reduced to eating their sealskin shoes, they devoured a seal's liver and became violently ill. Vomiting was followed by peeling of the skin from head to foot.[31] Ultimately, 4 of the captain's party survived, and only 37 of *Wager's* original complement of 243 returned to England.

The Pacific

When the four remaining ships of the squadron reached the islands of Juan Fernandez, off the coast of Chile, *Centurion* and *Tryal* could scarcely muster enough officers and men to anchor. *Gloucester* drifted to sea and took a month to return, by which time only one officer was capable of duty. That month cost the lives of another 54 men. Only 98 men and boys were still alive, and 10 more died there. They were avid for green plants, especially cresses and turnip tops, and they caught abundant fish, seals and some goats.[32] In an attempt to understand the nature of the scourge that had decimated the fleet, Etterick carried out a number of autopsies and Phillips reported the findings.[33]

Statistics compiled from ships' complements and stated losses in the various journals suggest that the officially computed mortality in the remaining four ships had now reached 679 out of their original combined complement of 1,029 and that, when deaths in *Severn, Pearl* and *Wager* are added, overall squadron losses were 1,059 out of the original strength of 1,955. However, by careful tabulation of each muster book, it seems clear that ships sailed short of complement, since many were discharged before sailing, either to hospital or on shore as "unserviceable." It is impossible to obtain accurate figures, for the various documents — journals, logs and muster books — all differ, but the number borne on the four remaining ships, allowing for transfers and some discharges en route, may have been as low as 973. The total number of recorded deaths before sailing from Juan Fernandez was 623, leaving only 350 survivors at this point. Yet the catastrophe might have been even greater, for a Spanish squadron of four warships, sent by the Viceroy of Peru to patrol off Juan Fernandez until Anson's arrival, had finally tired of waiting, since its commander could not believe that Anson would succeed in rounding the Horn with his sickly crews after learning that Pizarro's squadron, better built, provisioned and manned, had failed to do so.[34]

Despite his losses, Anson resolutely sailed on to comply with his orders and seized Spanish shipping off the coast of Chile. From his prisoners he learned of Vernon's failure to take Cartagena, which effectually disposed of the plan of rendezvous at Panama. The capture of the great Spanish treasure galleon now became Anson's principal objective. After burning Paita, in Peru, whose governor refused him refreshments, he lay in wait off Acapulco with his greatly augmented fleet, his men now restored to health and fighting fit. Spanish intelli-

gence, however, proved too good, and the prize galleon stayed in harbour. After a fruitless sea watch for five months, Anson watered at Chequetan before crossing the vast Pacific in order to await the arrival of the galleon off the Philippines. The state of *Tryal* and *Anna* had already forced him to destroy them. Now, after the release of his Spanish prisoners, manpower shortages compelled him to sink the Spanish prizes and return their English crews to *Centurion* and *Gloucester* for the Pacific crossing. But he retained 108 of their Negro and Indian seamen to help sail his own ships.

Passage to China

After seven weeks of fine weather and calm seas, which allowed adequate ventilation of the ships, scurvy struck again with increased virulence. Men were dying so rapidly that Anson tried unsuccessfully to persuade his senior surgeon, Etterick, to prescribe the drop and pill of a notorious quack, Joseph Ward, which had been provided for the voyage by the Admiralty, since the oil of vitriol recommended by the College of Physicians[35] had significantly failed to influence the disease. The remedy contained antimony, balsam and wine and caused violent sweating, vomiting, purging and increased mortality among those tempted to take it.[36] Violent storms then caused dangerous leaks in both ships and, by 14 August, the dismasted *Gloucester* could find only

FIGURE 4. The watering place at Tinian with Centurion *in the background. From Walter,*[6] *1748.*

16 men and 11 boys fit enough to keep her afloat. On 16 August, *Gloucester* was burned and her 89 survivors, including 17 formerly in *Tryal,* were taken into *Centurion,* many dying during transfer. Edmund Wallbank, her surgeon, expired soon afterward. On 28 August, *Centurion* finally made her landfall at the island of Tinian (Fig. 4) in the Ladrones (now Marianas), where abundant fruit, including oranges, lemons and breadfruit, together with fresh beef and poultry, restored many of her 202 survivors to health.

Not all, however, for recovery from niacin deficiency took longer. In a letter from Macao after his passage from Tinian, Anson wrote that "some have not recovered their senses, for numbers turned Mad and Idiots with the Scurvey. I cannot pretend to describe that terrible distemper, but no Plague ever equalled the degree we had of it. . . ."[37] Anson's own mental state is permanently recorded at Shugborough Hall on a dinner service (Fig. 5), presented to him by Canton mer-

FIGURE 5. Plate from a dinner service in Shugborough Hall, presented to Anson by Canton merchants. From the collection of the Museum of Staffordshire Life, Shugborough.

chants after *Centurion's* men had extinguished a huge fire that threatened to destroy the town. He evidently influenced the design, central to which is the breadfruit tree on the island of Tinian, which Anson believed had saved their lives. Around it is coiled a garland in the form of an Aesculapian snake. Scenes of home, the Shugborough sheep, a bridge, local ruins, the Eddystone lighthouse and Plymouth Sound betray nostalgia, a common accompaniment of vitamin deficiency syndromes in seamen on long voyages.

The Action with the Spanish Galleon

After convalescence in Macao, where *Centurion* was repaired and reprovisioned and his crew augmented to 227, the intrepid Anson sailed to the Philippines to waylay the heavily armed Spanish treasure galleon *Nuestra Señora de Covadonga,* manned by 400 men. In the ensuing encounter (Fig. 6), Anson deployed his small force to such advantage that, after a brief engagement, the galleon surrendered. *Centurion* lost 3 men and 17 were wounded,[38] while *Covadonga* had 67 killed and 84 wounded.[39] When Saumarez boarded the galleon after the action, he found "their decks . . . promiscuously covered with

FIGURE 6. The action between the Centurion *and* Nuestra Señora de Covadonga, *by John Cleveley, 1756. From the collection of the Museum of Staffordshire Life, Shugborough.*

carcasses, entrails and dismembered limbs,"[40] so Anson immediately sent over the ex-*Tryal* surgeons, Allen and Neasmith. According to Pascoe Thomas, the schoolmaster, they performed so well that "all the rest, to the Number of about 60, were very well recovered, and several of these were very surprizing cures."[41]

Homecoming

Anson reached England by way of the Cape of Good Hope in July 1744, laden with plunder variously estimated to be between one half and one million pounds sterling. It was a vast sum for those days and was brought by Anson's men to the Tower of London in triumphant procession (Fig. 7).[42] That treasure had cost the lives of at least 1,355 men. Out of a fleet of eight ships manned by 1,955 men, there were 540 survivors if we accept the official figures, but according to the actual entries, there were only 415 survivors out of 1,746 men. Only one ship, the *Centurion,* and less than 155 men completed the circumnavigation. Yet Anson's adversary, Pizarro, had fared even worse. Fail-

FIGURE 7. "England's Glory." The Procession to the Tower. From a print by Thomas Bakewell, 1744. From the collection of The Museum of Staffordshire Life, Shugborough.

ing even to round the Horn, his squadron was scattered, his ships wrecked, and only the flagship returned to Spain. There were fewer than 100 survivors out of the 3,000 handpicked seamen who had embarked on Pizarro's expedition.[43]

The Sequel

The importance of the Anson voyage lies not so much in the triumph of the human spirit over disaster and disease as in the accurate clinical descriptions of syndromes associated with dietary deficiencies of vitamin A, vitamin C and vitamins of the B group, together with the first known description of hypervitaminosis A. The journals of the navigators established a clear relationship between nutritional status and performance, susceptibility to infection and environmental stress, which, in turn, precipitated overt signs of vitamin deficiency.

The voyage also highlighted Anson's superb qualities of leadership and organizing ability. They swept him to the highest office. As a reforming First Lord of the Admiralty, he eradicated dishonesty in naval dockyards, improved the quality of shipbuilding, reorganized the marines and laid down new regulations for hygiene and victualling with an emphasis on fresh vegetables.[44] It was this concern for the health and well-being of sailors that brought to his attention a scientifically designed, controlled, clinical trial carried out by the naval surgeon, James Lind, on board H.M.S. *Salisbury* in 1747.[45] This experiment demonstrated conclusively the power of lemons and oranges to cure matched cases on a scorbutic diet where other remedies failed. Anson appointed Lind physician in charge of the newly built 2,000-bed naval hospital at Haslar, near Portsmouth, where Lind established standards of hospital care never previously attained.[46,47] Thereafter, his three great works on scurvy,[45] naval hygiene[48] and tropical medicine[49] became the *vade mecum* of everyone concerned with the preservation of health at sea.

The Royal Society of Medicine
1 Wimpole Street,
London, W1M 8AE
England

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Current Concepts of Cancer Metastasis

GEORGE POSTE

Metastasis is probably the one aspect of cancer that is best known to the public, and is certainly the most feared.

The fact that metastases represent an extension of cells from a primary tumor rather than a spontaneous origin of multiple tumors throughout the body was first documented in France in 1829. In 1850, as microscopic pathology began to evolve, for the first time there came into use a term that will appear in the following report; namely, "phenotype heterogeneity" among the cells that populate tumors. With the evolution of microscopic pathology we entered an era in which both clinical and experimental description documented in ever greater detail the roots of metastatic dissemination within a body. Then, from 1920, in a task that still consumes the research efforts of laboratories involved in the study of metastases, considerable experimental work began with transplantable tumors in animals. This area of study has a long and distinguished history, but there are still many mysteries associated with the pathogenesis of this disease. From the mid-1970s, we have begun to see for the first time at least the beginning of an understanding of the cell biology of metastasis and, in particular, of the fact that cells coexisting within the same tumor do not have the same metastatic capacity. Recognizing that tumor cells coexisting within a malignant tumor have a graded metastatic potential and that both metastatic and nonmetastatic cells may coexist in the same tumor, we have for the first time an opportunity to begin the laborious exercise of studying what is different about tumor cells that are endowed with the life-threatening trait of metastasis and those that are not. This question is now at the forefront of research on metastasis.

Cloning

The problem came to be resolved by cloning tumor cells. If every cell within a tumor was endowed with the same metastatic capacity, the isolated clones should all have the same metastatic capacity; but if only certain cells were so endowed, both metastatic cells and nonmetastatic cells could be recovered. This situation, in fact, has proved to be the most striking finding in experimental animal tumors and in

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human tumors. Now in the mid-1980s we begin to recognize that there are very complex entities at the cellular level in the metastatic process. Today we can define tumor cell heterogeneity at three different levels. While neoplasms of comparable histological origin may show general behavioral similarities, there are, nonetheless, subtle differences in the cellular populations present within each of them. At the same time, in any patient the character of cell populations present in different metastatic lesions differs. We must also not lose sight of the fact that a tumor is a dynamic entity and that its cellular composition changes over a period of time in the face of selection pressures acting against its constituent cells, with a nature and intensity that differ between individuals.

Control

How is this process of cellular diversification during tumor growth controlled? This is one of the most pressing questions in contemporary research on metastasis. It is no longer necessary to demonstrate that tumors are highly heterogeneous and composed of cells with widely differing properties. What has been accomplished over the last decade is the use of the tools of cell biology to explore areas that light microscopists have been telling us about since the mid-nineteenth century. Although so far we have considered heterogeneity in the metastatic capacity of tumor cells, they themselves exhibit an extraordinary panorama of variability for virtually any phenotype trait, whether the pathway be karyotypic, antigenic, or biochemical. Of profound clinical importance is that variations exist in the susceptibility of tumor cells to different classes of therapeutic agents. These variations range from cell populations that are highly susceptible to those that are resistant or, in some cases, refractory to treatment. So a major challenge is to begin to understand how the process of diversity is controlled. A distinguished Fellow of the College of Physicians of Philadelphia, Dr. Peter Nowell, is responsible for the concept of clonal progression within tumors, in which cellular diversity evolves during progressive tumor growth by the emergence of successive generations of new tumor cell clones that exhibit different phenotypic traits.

Cellular Instability

In addition to the inexorable progression to variability by clonal diversification and expansion, many tumor cells appear to be unstable

and able to generate new variant progeny very quickly. This can be tested by cloning tumor cells, isolating a series of subclones from the population at intervals and determining whether these clones have exactly the same phenotype as the original parental cell. If they do, one would predictably refer to the clone as phenotypically stable for the particular phenotype being considered. If, however, some of the subclones resemble their parent but others now exhibit very different phenotypes from the cell from which they were derived, the clone is classified as phenotypically unstable. In the late 1970s and early 1980s we came upon the rather disturbing possibility that tumors are more than the sum of their parts; they are not simply passive assemblies of cells but are different subpopulations of tumor cells that are able, mysteriously, to influence each other's behavior. This was revealed in experiments showing that clones grown in isolation exhibited highly unstable phenotypes but clones grown in the presence of *other* clones from the same tumor were phenotypically stable and retained their original characteristics. This raised the interesting question of what would happen in the setting of metastasis. What happens when a primary tumor that may have become heterogeneous with regard to the cell populations within it is disseminated and its progeny cells are deprived of "conversation" with other clonal subpopulations from the primary tumor? Will the cellular composition of a metastasis *faithfully* reflect the properties of just the parent cell or, because this cell is no longer subject to "conversation" with other clones, will a rapid evolution of variant cells take place to create cellular heterogeneity within the metastasis? What we found in animal studies is that the majority of metastases—if we sampled them from an organ such as the lung—arise from *two or more* tumor cells. The cells in any given metastasis are different; however, very rapidly a panel of new clonal variants will emerge, so that in a short time a situation develops in which, on a single lesion basis, there has been progression from a lesion that is homogeneous in cellular content to one that is heterogeneous. This may have little importance in terms of volume of lung tissue occupied, but each one of the subpopulations of cells that emerges is likely to show an entirely different pattern of sensitivity to chemotherapeutic agents—a sobering concept in the evolution of intralesional heterogeneity.

The composition of tumors also changes during their progressive growth. We have considered tumor cell clones that are phenotypically unstable but can be stabilized by some form of unknown interaction with other clones. Now let us turn to what may be the most dangerous tumor cell of all, i.e., one that is unstable and that is apparently no longer responsive to the "conversation" that regulates cells that can be made stable.

Behavioral Traits

We must not view tumors simply as complex cellular composites with different metastatic properties; they, in fact, show three different forms of behavioral traits. One example from analysis of spontaneous mammary tumors in mice suggests that, if we examine tumors early after their detection (less than three months after they have been first identified as palpable lesions), the predominant type of clone is phenotypically stable. There are, in tumors of this early age, some clones capable of rapidly generating variants, but the rate of formation of variants can be slowed if these are cocultivated with other clones, i.e., they are stabilizable. In tumors that are relatively advanced (those that have been identified as macroscopic lesions three to six months previously) the majority of clones are phenotypically *unstable* but are stabilizable. But, in advanced tumors, stable clones are an absolute minority. Many of them are unstable but stabilizable by signals coming from other clones. For the first time, however, we now see the emergence of totally autonomous populations that are completely unresponsive to whatever signal mechanisms are imposed by tumor cells when they "talk to each other."

What appears to be happening is that as a tumor grows, not only is there clonal diversification, as proposed by Peter Nowell, but also within it tumor cells evolve that are increasingly unstable and are able to generate variants with widely different properties. One of the most troubling properties in this regard concerns variation in sensitivity to chemotherapeutic agents.

Consider for a moment some of the general implications of these features of tumor biology. As I indicated earlier, the progressive growth of tumors involves the generation and expansion of subpopulations of tumor cells that differ from each other in a wide variety of biological properties, including responsiveness to chemotherapeutic agents. A few years ago we heard of the "extraordinary" level of cellular heter-

ogeneity in tumors, but now we are faced with "radical" heterogeneity because we do not know how many subpopulations of cells exist in any tumor. All we know is that there are far too many for us to measure in terms of any of the experimental techniques now available to us. During progressive growth not only is a tumor growing in bulk but multiple cell populations are evolving within it.

Cell Survival

It seems likely that the generation of heterogeneity within a tumor increases its biological fitness. I use the term "fitness" in the sense of a classical Darwinian model, i.e., the generation of cellular diversity enhances the biological fitness of a tumor by increasing the probability that one or more subpopulations of its cells will have properties needed to survive in the face of diverse selection pressures, whether these be mounted by the host in attempting to detect and destroy tumor cells or are pressures occurring from therapy. The generation and expansion of tumor cells is influenced not only by these selective pressures but also, as I have emphasized, by interactions occurring between the constituent tumor cell subpopulations in such a way that events that cause extensive restriction in subpopulation diversity in a heterogeneous lesion can stimulate the formation of new clones with altered phenotypes.

There are three situations in the life of a tumor where this factor may be of substantial functional importance. The first is in the initial growth of metastasis, which, arising predominantly from a single cell, will be monogeneous in their initial growth. Yet, if a cell responsible for initiating a metastasis is responsive to signals from other populations of tumor cells that were present in the primary tumor, it is now deprived of these "conversations" and finds itself in a situation in which subpopulation diversity is restricted. This in turn serves to stimulate the evolution of new tumor cells within the lesion.

The same mechanism also lends tumors an effective mechanism for sustaining heterogeneity by providing them with a "bounce-back" mechanism to avoid being dominated by just one or two subpopulations of cells. If it is important for a tumor to sustain cellular heterogeneity in order that such diversity will permit it better to survive diverse selection assaults acting against it, any time a tumor becomes dominated by one or a few subpopulations of cells, the restriction of subpopulation diversity puts the growth at risk. Irrespective of the

mechanism by which a few clones or a single clone achieves increasing dominance, the result is a restriction of subpopulation diversity. Clones that survive are no longer subject to controlling interactions imposed by "conversation" with the broader panel of clones that were present originally. Yet a cycle is established. The very event of domination carries with it the seeds of its own demise. Cells, by gaining dominance and limiting subpopulation diversity, provide a potent signal for the rapid formation of cell variants to generate a clonally heterogeneous lesion again. Once more, the nature of tumor cell subpopulations that are formed by rapid phenotypic diversification are, in all probability, highly different from the clones that were present in the original lesion before particular clones achieved their "dominance."

Therapeutic Response

The most challenging, and certainly the most disturbing, question arising from this proposal concerns the potential effect of therapy (single/multi-agent; single/multi-modality) on the dynamics of tumor cell subpopulations. If a particular therapy* were to kill most, but not all, cellular subpopulations in a heterogeneous, polyclonal tumor (as is typically the case), the surviving subpopulations might be rendered phenotypically unstable because of loss of the regulatory interactions between constituent subpopulations.

By restricting subpopulation diversity, therapy may perturb the "plateau" phase condition and stimulate rapid formation of new tumor cell variants from the surviving subpopulations (Fig. 1). Generation of variants would then continue until a sufficient level of subpopulation diversity was achieved to impose a new "equilibrium" again via interaction between subpopulations and reduce the rate at which new variants emerge. Exposure of the tumor to subsequent treatment regimens would then repeat the cycle unless a therapeutic regimen was identified that was able to eliminate the surviving subpopulations before they had time to generate new variants (Th+ in Fig. 1).

If the scheme in Figure 1 is correct, new experimental strategies will need to be explored with the objective of overcoming the problem of phenotypic instability in tumor cell subpopulations that survive

*The terms "therapy" and "treatment" used here do not refer to any specific anticancer agent or modality but to multi-agent/multi-modalities as well as to single agent/modality treatment protocols.

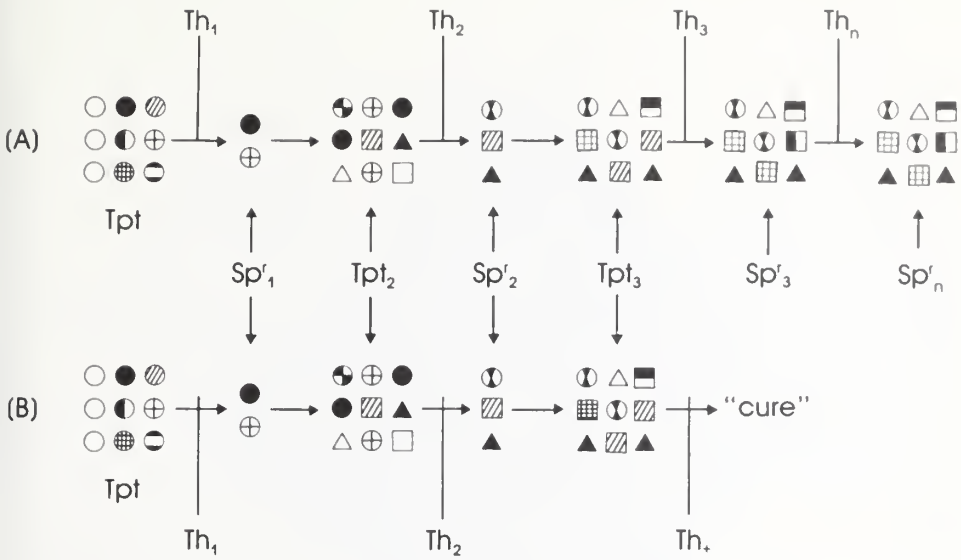

FIGURE 1. The possible effects of therapy (Th) on subpopulation diversity and stability of the metastatic phenotype in neoplastic lesions. Therapy does not refer to a specific modality, agent or combination of these but is used to describe therapeutic intervention that is successful in killing some, but not all, tumor cell subpopulations in a heterogeneous lesion, primary or metastatic.

By the time of initial clinical detection and beginning of therapy the lesion contains multiple tumor cell subpopulations (illustrated by the different symbols). These have reached a "plateau" phase in which interactions occurring between the various subpopulations limit the rate at which new metastatic variants are generated. On exposure to therapy (Th_1), susceptible subpopulations are killed and others survive (SP_1^r). Restriction of subpopulation diversity may render the surviving subpopulations phenotypically unstable and thus act as a stimulus for the generation of a new panel of tumor cell variants with widely differing metastatic properties. With increasing diversification a new "plateau" state will again be imposed (Tpt_1). On subsequent exposure to different treatment regimens (Th^2; Th_3) the cycle of subpopulation restriction and diversification will be repeated until either subpopulations resistant to all therapeutic efforts (SP^r_n) kill the patient (Scheme A) or a therapeutic modality (TH_+) is identified that can kill all subpopulations within the lesion (Scheme B). Modified from Poste and Greig (1982).[7]

a previous treatment protocol. One approach would be to reduce the time interval between successive treatments with different agents (Fig. 2). We have coined the acronym FAST (Fast Accelerated Staging of Therapy) to describe this strategy.

The aim of using a series of different treatment protocols in rapid succession would be to attempt to kill not only those subpopulations

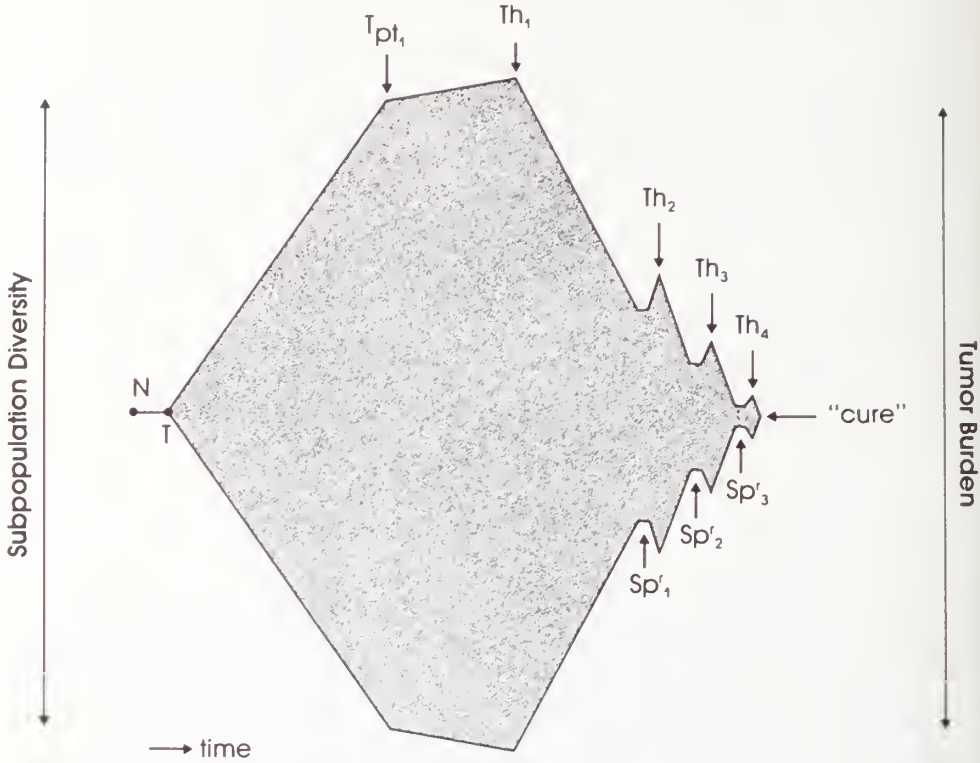

FIGURE 2. Schematic illustration of proposed FAST cancer treatment protocol (FAST = Fast Accelerated Staging of Therapy). Following initial transformation of a normal cell (N) to establish an initial focus of tumor cells (T), new variants are generated to create a heterogeneous lesion populated by diverse subpopulations that eventually establish a "plateau" state (Tpt) in which the generation of new variants is relatively low. When this population is exposed to therapy (Th_1), the subpopulation diversity and cell mass is reduced by killing susceptible subpopulations. The restriction of subpopulation diversity produced by this initial therapeutic assault may provide a stimulus for surviving resistant subpopulations (SP_1^r) to generate new metastatic variants rapidly. However, unlike the example shown in Figure 3 in which exposure to a second, different treatment regimen is delayed until proliferation of the surviving cells (SP_1^r) creates a clinically detectable lesion, in this example the second treatment regimen (Th_2) is given very shortly after the first treatment protocol even though a residual tumor burden may not be evident clinically. By repeating the process and reducing the interval between successive treatment regimens (Th_1–Th_3), it is intended that each successive treatment in the series would kill susceptible subpopulations in the tumor fractions that survive the preceding treatment(s) (SP^r_{1-3}) before they are able to generate a large number of new variants that may include variant phenotypes that would prove resistant to all available therapies. By truncating successive treatment regimens into a limited time period, we may find it possible either to eradicate tumor cells or to reduce the residual tumor burden to a sufficiently low level that host defense mechanisms, perhaps augmented by biological response modifier therapy, can kill any remaining tumor cells.

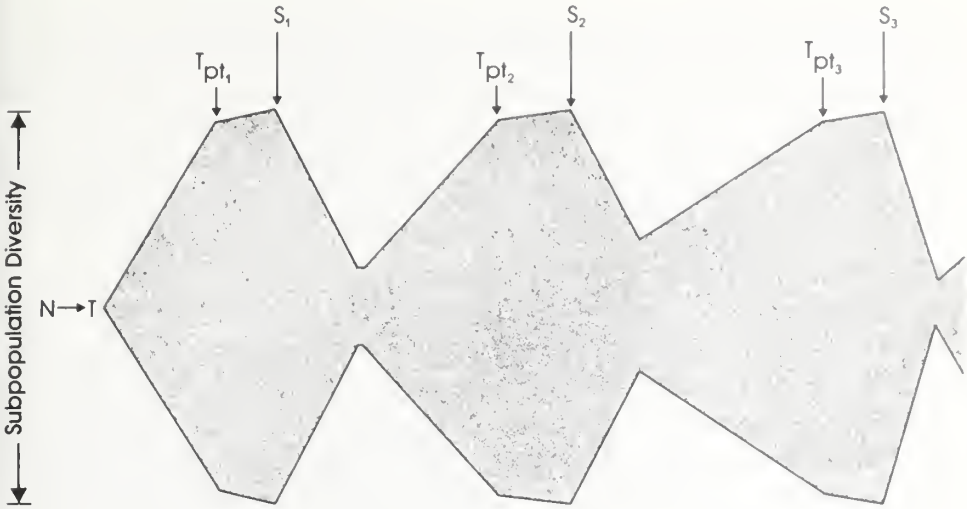

FIGURE 3. Schematic illustration of the possible effects of extended staging of successive treatment regimens on subpopulation diversity in neoplastic lesions. After initial transformation of a normal cell (N) to establish an initial focus of tumor cells (T), extensive clonal diversity is generated, creating a heterogeneous lesion populated by diverse subpopulations that interact and reach a "plateau" state (Tpt) in which emergence of new variant subpopulations is limited. Treatment of such a lesion (S_1) destroys some, but not all, subpopulations. This restriction in subpopulation diversity will stimulate the surviving subpopulation to generate new variants. This diversification process culminates in the establishment of a new "plateau" state (Tpt_2). By this time, recurrent tumor growth is detectable clinically, and a second, different treatment regimen (S_2) is initiated, ensuing in another cycle of subpopulation restriction and diversification. This process will continue until either the patient dies from a tumor burden that is refractory to multiple successive treatments or a therapy is identified that is able to eradicate the entire remaining tumor burden. In contrast to the treatment strategy shown in Figure 2, the extended intervals between successive treatments shown in this figure may allow residual tumor cells to undergo extensive phenotype diversification between treatments, thus increasing the likelihood that new variants refractory to therapy will emerge.

The term "therapy" does not refer to any specific anti-cancer agent or modality. The illustrated sequence of events is applicable to treatment regimens using any agent or modality, either alone or in combination, that fails to kill all the tumor subpopulations present in the lesion. (Modified from Poste and Greig.)[7]

that survive the previous treatment before they can generate large numbers of new variants but also to kill new variant subpopulations as soon as they emerge (Fig. 2). This contrasts with the practice used in many clinical situations in which subsequent treatment regimens

using different agents are often not employed if the first treatment protocol appears successful in eliminating clinically detectable tumor burden and new treatment regimens are implemented only when evidence of a recurrent tumor is detected (Fig. 3). By the time such recurrent lesions become detectable clinically, phenotypic diversification of the surviving subpopulations may well have taken place and the lesion consists of a diverse set of new subpopulations that may have widely differing therapeutic sensitivities (Fig. 1).

The variable nature of the response of malignant tumor cell subpopulations to cytotoxic drugs and other therapeutic modalities makes it unlikely that a single treatment regimen will be able to kill the cells in a tumor, even if several agents are used simultaneously. This problem has been all too familiar to clinicians for a long time. Treatments are available that are effective in destroying the majority of malignant cells within a growth, and the tumor residue remaining after such treatment is often so small that it cannot be detected clinically. In animal tumors this situation represents the end point of most assays of drug activity. Similarly, in many clinical situations, following completion of a treatment protocol that eliminates clinically detectable tumor burden, further treatment regimens are not undertaken routinely. New regimens are employed only when a patient presents some time later with clinical evidence of recurrent disease. However, the data here presented suggests that by the time recurrent disease is diagnosed and subjected to a new therapeutic protocol (Th_2 in Fig. 1), the cells involved may be phenotypically very different from those in the original tumor owing to rapid formation of new variant subpopulations induced by the restriction of subpopulation diversity caused by the initial treatment. Subpopulations present in the recurrent lesions will not only be resistant to the agent(s) used in the first treatment protocol but will also very likely be resistant to other agents as well.

This concept, apparently valid, requires new experimental systems to investigate two major questions: Can therapy, by restricting subpopulation diversity within a heterogeneous neoplastic lesion (primary tumor or metastases), increase the phenotypic instability of surviving subpopulations, enhancing the rate at which new variant tumor cells appear? Can phenotypic diversification of the residual tumor burden surviving a first treatment protocol (single or multiple modalities) be blocked by treatment with a series of different treat-

ment regimens administered in rapid succession (Fig. 2)?

Research on these questions is only just beginning, and considerably more knowledge is needed before the question of accelerated staging of successive treatment cycles can be considered in the clinic. In suggesting that therapy may stimulate phenotypic diversification and facilitate emergence of increasingly aggressive tumor cell variants, we do not propose that current therapies be withheld or abandoned.

The more immediate issue is to establish whether the problems discussed here are of limited or general significance in the behavior of malignant tumors. This will require further experiments to determine the effect of different therapeutic modalities and their staging on the phenotypic stability and metastatic behavior of tumor cell subpopulations in neoplasms containing different numbers of identifiable subpopulations. The technical difficulties of such experiments are formidable. Most rodent tumors are unsuitable for evaluating the FAST protocol shown in Figure 2. Alternative test systems need to be found. The treatment of canine and feline neoplasms in veterinary clinics may provide possible opportunities for evaluating the FAST protocol, and the feasibility of this option is now under investigation.

Conclusion

The extensive phenotypic heterogeneity of tumor cell subpopulations coexisting in the same tumor has emerged as a major focal point for investigations in several areas of cancer research. The problem of tumor cell heterogeneity is also recognized as a major limiting factor in the successful treatment of solid tumors and their metastases.

Cellular heterogeneity observed in malignant neoplasms is generated by the relentless emergence of new clonal subpopulations of tumor cells that express phenotypes that render them increasingly unresponsive to host control. Clonal diversification and expansion provide a powerful mechanism for enhancing the biological "fitness" of tumors. The genesis of extensive cellular variation increases the likelihood that at least some tumor cell subpopulations will prove "fit" to survive in the face of the diverse array of destructive selection pressures that a tumor will encounter during its lifetime whether these be mounted by the host or by the clinical oncologist. It is these surviving subpopulations and their variant progeny that are responsible for clinically recurrent disease.

A full understanding of tumor cell heterogeneity will require more than simple cataloging of the number of tumor cell subpopulations present in a particular tumor at any given stage in its evolution. Evidence is beginning to emerge suggesting that tumors are more than a passive assembly of constituent cellular subpopulations. We must now begin to view tumors as complex entities in which the number of cellular subpopulations and their properties are changing constantly, not just in relation to selection pressures but also as a consequence of interactions occurring between the subpopulations themselves.

Evidence suggests that interactions occurring between clonal subpopulations exert a significant effect on the rate at which new subpopulations are created with altered metastatic properties. Of particular interest is the new finding that events that restrict subpopulation diversity in heterogeneous, polyclonal tumor cell populations enhance the rate at which the surviving subpopulations generate new variants. This property affords tumors with an important mechanism for regenerating and sustaining significant cellular heterogeneity in response to both external selection pressures and shifts in subpopulation composition arising from changes in the tumor's own growth dynamics.

I hope that the brevity of this report has not rendered some of the concepts discussed too remote or too diffuse. It is a fair conclusion that we can now say that tumors are far more diverse than we ever imagined them to be. Tumors are not simply static entities. Their cellular composition changes radically during tumor progression and is accompanied by the emergence of subpopulations of cells that are increasingly "unstable" and have an increased ability to generate daughter cells whose properties may differ from their parent cells. Whereas the symbol by which cancer has been known since antiquity is the crab, our new insights into the cellular diversity of tumors suggest that a more fitting emblem for the metastatic tumor may be the chimera with its multiple component parts and its ability, once damaged, to regenerate an entirely different part.

Smith Kline & French Laboratories
1500 Spring Garden Street
Philadelphia, Pennsylvania 19101

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Challenges to the Use of Animal Models in Research, Education and Testing

JOHN F. SHERMAN

Probably no single issue has confronted those involved with medical or behavioral research, the education of health professionals or individuals involved in testing pharmaceuticals more consistently than the question of using animals in the laboratory. Beginning in the 1800s with the enactment in Britain and America of anticruelty acts, concerns about the welfare of beasts of burden were extended to include animals used in laboratory investigations. From time to time these concerns led to clear restrictions, and both here and abroad there has always been some opposition to such practice. Attitudes have waxed and waned with perceptible cyclic influence in the political field. We are at present on the ascending segment of such a curve as the efforts of activist organizations to reduce or eliminate the use of animals grow more intense.

Background

The bases for these attacks are varied. Particularly conspicuous are arguments based on ethics, alleging, as they do, that humans have no right to impose their wills on creatures that are sentient but powerless to counter the impositions forced on them by humans. Other attitudes sanction the use of animals for scientific purposes but propose that less painful experiments, fewer animals or those of lower species could be used if scientists were more considerate and imaginative.

Others claim that research requiring animals would be unnecessary if humans would adopt more sensible life-styles and were more considerate of their environment.

In the opposing view, justification for the use of animals in research, education and testing has changed very little in recent years. Numerous articles have been written in the scientific and lay press citing the contributions of animal experimentation to scientific advances and

An expansion and extension of remarks made by the author before the Greater Philadelphia Committee for the Medical Pharmaceutical Sciences at the College of Physicians of Philadelphia, March 26, 1985.

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offering evidence supporting arguments to continue. Among the most comprehensive was a series of articles in *The Physiologist,* published by the American Physiological Society, examining the roles of various species, including subhuman primates, cats, dogs, rabbits and mice. The articles were written by acknowledged experts and were expressed in language that could be understood by the general public. They specifically document familiar and less well known examples of invaluable research based on work with animals.

The public is not so well informed about the degree to which individuals, especially surgeons, rely on the use of experimental animals in order to learn. Such involvement ranges from rodents in acquiring microsurgical techniques to larger animals for training in cardiovascular surgery. Although there has been a marked decrease in animal laboratory exercises in both college and professional school levels, many departments of physiology continue to depend on some animals for demonstrating the complexities of life-maintaining systems in higher species.

The importance of animal models has been recognized for assessing the safety and efficacy of a wide variety of chemicals, pharmaceuticals and prostheses. A view in our society, often documented in laws and regulations, holds that new products should be carefully examined to establish proper indications for use. These assessments usually involve animal models before exposing even limited numbers of humans to possible risks. Although it is hard to draw the line between research and testing, such a distinction is an important one if only because the laws are there to protect human health. It is here that some of the most publicized controversies have arisen, especially involving standard procedures for determining levels of toxicity (e.g., the LD50 test) or the threat of side effects, such as irritation caused by chemical or cosmetic agents.

The Current Situation

Much of the background for the present controversy and its increasing intensity is familiar to us. Certain new considerations complicate the issue. These deserve our particular attention *now.*

One new tactic that has recently come to light is a concerted attack on the relevancy and quality of some research *per se.* Efforts are being made to recruit individuals, especially those with scientific credentials, to scan research protocols obtained under the Freedom of Information

Act in grants funded by the National Institutes of Health (NIH) in order to judge the value of and need for a specific project—especially the justification for the number and species of animals involved in such a project. For example, research conducted under support from the NIH at the Head Injury Center of the Medical School of the University of Pennsylvania has been publicly challenged on the basis of levels of analgesia and anaesthesia employed during experiments involving baboons and the possible deleterious results on animals of certain methods of restraint.

Another line of criticism alleges that the development of "alternative methods" that might involve fewer animals, lower species or no animals at all is not being pursued with sufficient vigor by scientists and funding agencies. (The term "alternative methods" is, in this observer's opinion, a misleading one, suggesting that it might be possible to eliminate animal use completely. It might be better to cite "adjunct methods.") This view has been greatly reinforced by a recent publication of the National Academy Press of a report, "Models for Biomedical Research: A New Perspective," in which scientists are urged to examine more diligently the possible use of models of lower forms of life, especially for investigations designed to elucidate basic mechanisms of biology. However, the report points out that "for many biomedical problems, there are no adequate nonmammalian models. In such cases, the NIH . . . should continue to support research using the best mammalian models."

Allegations and charges of cruelty and downright waste of animal life are intensified by the emerging character of the animal rights movement. Action groups are now better financed and organized than they were previously, and the number of organizations involved has grown. In 1984 the Association for Biomedical Research (now a part of the National Association for Biomedical Research) identified more than 130 organizations committed to this cause. They range from long-established, comparatively moderate bodies such as the Society for the Prevention of Cruelty to Animals to those that are new and aggressive. People for the Ethical Treatment of Animals aims to eliminate the use of animals in research, education and testing. Their new leaders are sophisticated and fully acquainted with media techniques in the presentation of their case to the public. They draw on lurid descriptions of experimental methods, some of which have not been used for years, and the skilled exhibition of photographs, all of which offer a

formidable challenge to their opponents. If in the past the scientific community has ignored or dismissed these groups as "know nothings" without intellectual stature, they should realize that these people have taken on increased credibility by recruiting a number of recognized ethicists and philosophers.

One ominous departure of late has been the use of violence among the more extreme zealots. A shadow group calling itself the Animal Liberation Front has claimed credit for a number of break-ins at medical centers here and in Britain. Records and equipment have been destroyed, animals stolen, laboratories wrecked and the lives of scientists using animals threatened. Fire bombings have occurred in England.

Such a trend has put academic institutions in a major dilemma with respect to security. Great sums of money would be required to increase existing security systems, and there is the collateral problem of the effect of these measures on time-honored and cherished traditions of openness within academic institutions. There is even reason to suspect that in some incidents individuals associated with the institutions served as participants or informants for the animal rights movement.

The Defenders

There have been some changes in the attitudes of those defending the use of animals in experiments. There exists now in our society more sensitivity to the well-being of research subjects, human or animal, among biomedical and behavioral scientists than in the past. It seems reasonable that these scientists, as a group, are no less disposed to humane attitudes than members of the general public are. Indeed, given their reverence for life, one might assume that they are more respectful of animals than are most of their fellows. Many scientists have discontinued the use of instruments and methods previously employed without question, such as the Noble-Collip drum and the use of curare or other paralytic agents. From a pragmatic point of view the greatly increased costs associated with acquiring and maintaining animals, together with the availability of adjunct methods, have stimulated already existing ethical sensitivity.

The subject of so-called "alternative methods" deserves a word or two in passing, given the recent prominence it has attained. It raises attractive possibilities for several reasons:

In terms of appropriateness and accuracy, adjunct methods can provide more reliable data with a narrower range of variation than holds for complex living organisms in *some* experimental situations.

Adjunct methods are often less expensive.

They are frequently less troublesome and more pleasant to work with than in cases involving larger animals.

Contentions, then, that scientists insist on using animals when unjustified are not always true. Advocates of a wholesale use of alternatives or the diversion of research funds to develop alternative methods have a certain plausibility in their arguments that could damage research efforts generally and could prove illusory. For example, recommendations have been made recently to appropriations committees in Congress that funds be allocated or shifted from programs at NIH in order to concentrate on new methods. In a time of sharply reduced research funding, this proposal should be highly suspect as long as, in research and perhaps in testing, most, if not all, scientists are already attempting to improve and simplify their methods.

A further word is in order about the evolution of regulations governing the use of animals in federally funded projects. The NIH periodically contracts with the National Academy of Sciences to update its Guide of the Institute of Laboratory Animal Resources. Recently the Public Health Service has tightened its guidelines after long debate over more restrictive provisions. The NIH has been conducting site visits to evaluate the actual level of compliance with guidelines in federally supported, nonfederal institutions.

The Political Scene

Any discussion of this topic must include some consideration of the political climate at present. Two points are pertinent. Animal rights organizations are vigorously promoting restrictive legislation at *all* levels of government. During this year's legislative sessions twenty-two states considered bills that would severely limit the availability of certain animals for research. Another legislative target has been the opposition to the release to research laboratories of unwanted animals, especially cats and dogs, from pounds. Many of the twenty-two state legislatures debated bills prohibiting such a practice. About a dozen organizations have formed a National Coalition to Save Our Pets (Pro-Pet) with the stated goal of eliminating *all* access to research of pound animals throughout the country by 1990.

Animal rights groups pursue more restrictive legislation in Congress through modifications of the existing Animal Welfare Act, administered by the Department of Agriculture, and by amendments to the Public Health Service Act governing research supported by the NIH. Here the strategy of the scientific community is somewhat divided. Some believe that the pressure for restrictive legislation is so great that the community should identify some legislative vehicle with which they could live and support its passage as perhaps preemptive. Others argue that there is no possibility of successful preemptive legislation on an issue as emotionally charged as this. As a warning, they cite a restrictive compromise act passed in the Massachusetts legislature in 1984. The day after the enactment of the bill full-page advertisements appeared in Boston and New York newspapers declaring, in effect, "We have won the battle; now we must push on to win the war."

One must also consider the possibility that members of Congress, prompted by allegations concerning the head injury project at the University of Pennsylvania, may forbid the use of moneys appropriated to the NIH in support of that program. A more radical proposal to reduce or terminate funds from the NIH for *all* research involving animals apparently has been considered by the animal rights community but at the moment does not seem to have much support in Congress.* Such a threat is not to be taken lightly. Representatives Charles Rose (D-NC) and Rod Chandler (R-WA) obtained signatures of fifty-six other members of Congress to a letter addressed to Dr. James E. Wyngaarden, director of the NIH, urging discontinuance of funding for the head injury project until "an investigation of the [Head Injury] Center's activities can take place." This recalls a similar situation in 1984 when the Department of Defense appropriations bill was amended to prohibit the use of dogs and cats in the training of military personnel in the management of battlefield wounds.

*Following an investigation by the NIH and the University of Pennsylvania, work on this project has been stopped and its funding suspended. (Editor's note.)

Conclusion

It seems safe to predict that the present controversy will persist indefinitely. Both sides are deeply committed and there is very little common ground. Most polls of the public support the continued availability of animal models for research, frequently with the proviso that humane care will be provided and animals be used only when necessary. It appears that the scientific community must continue to rely on a considerable measure of faith in the public, the origin, after all, of all resources essential for research. At the same time, we must recognize that such faith may be tenuous and alterable on emotional grounds. The public must continue to believe that scientists respect the subjects so essential to their work, treat them humanely and use them only with proper justification.

Association of American Medical Colleges
One DuPont Circle
Washington, D.C. 20036

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Epidemic Neuropathies of Jamaica

GUSTAVO C. ROMÁN

Jamaica has been, throughout its history, one of the few places in the tropical world where neurological conditions have been documented in excellent detail. This study will review the epidemic neuropathies described in the island since the late 1600s, and an attempt will be made to determine, in a retrospective analysis, the likely causes of these neuropathies. Although very commonly the application of modern understanding to historical descriptions is plagued by error, the complete descriptions provided by physicians in Jamaica render this task particularly rewarding. It is also important to emphasize that, until now, these neuropathies have been considered either of mysterious cause or typical examples of neurological complications of "malnutrition," since clinically similar cases were observed in Far East prisoners of war during World War II. However, in none of the epidemics reviewed here was malnutrition mentioned, and the clinical picture is more consistent with other etiologies, toxic or postinfectious in nature.

Historical Background

The turbulent history of Jamaica begins with the disappearance of the native Arawak Indians after 150 years of Spanish rule.[1] In turn, Englishmen seized the island from Spain in 1655, and soon Port Royal became the buccaneering capital of the Caribbean.[2] Only twenty-five years later, sugar planters and armies of African slaves displaced the buccaneers,* and the slow taming of the island began. The rugged Blue Mountains, the thick jungles, and the deadly tropical diseases took a heavy toll on the settlers during the next hundred years. Life expectancy decreased considerably for white settlers coming from England. "It has been estimated that 12,000 Englishmen came to Jamaica in the first six years, yet the population of the colony in 1661

*According to Dunn[3] life in Jamaica became extremely disruptive for the planters after the buccaneers moved from Tortuga to Port Royal. The influence of Governor Sir Thomas Lynch before Charles II helped displace the pirates. However, this was obtained only after England's "Glorious Revolution" of 1688 under William of Orange. In February 1689 William confirmed a directive that finally moved the buccaneers north to San Domingo and the Bahamas.[3,4] (Author's note)

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was only 3,470."[4] Among black slaves the situation was also dismal: By 1790, Barbados, Jamaica, and the Leeward Islands had taken some 1,230,000 slaves from Africa, and the total black population was only 387,000 that same year.[5]

Common Complaints

Dr. Hans Sloane (1660–1753), physician to the duke of Albemarle, trained in France, a member of the Royal Society and disciple of Thomas Sydenham, in a detailed report "Of the Diseases I have observed in Jamaica, and the Method I used to Cure them,"[6] described intermittent, continued and remittent fevers, most probably malaria (quotidian, tertian, and quartan agues), and, following Sydenham's doctrines,[7] successfully treated them with Peruvian bark or Jesuits' powder (quinine). Also common was the bleeding fever or Barbados distemper (yellow fever) and diseases imported from Africa during the slave trade, such as guinea worm (*Dracunculus medinensis*), endemic treponematosis (yaws), lymphatic filariasis (elephantiasis), leprosy, and African trypanosomiasis (sleeping sickness). Among gastrointestinal diseases, the bloody flux (amebiasis), bacterial diarrhea and parasitic dysentery and infestations (hookworm) were rife. Tuberculosis and chronic liver disease, most likely due to malaria, hepatitis, and alcoholism, were commonly seen by Dr. Sloane.

Neuropathies

Very early in the history of Jamaica, epidemic outbreaks of strange palsies were also described among settlers and slaves. George Ellwood, writing in 1672, described the following:

> The diseases generally are here, at first coming, the flux, which turns to the bloody flux and a violent fever, which seldom keeps anyone above 4 days, for in that space of time they either recover or dye, and the gripes, which in a very short time takes away the use of their limbs.[8]

In fact, according to Richard Dunn:

> The most mysterious Caribbean malady of the seventeenth century was the dry bellyache, or dry gripes, perhaps induced by drinking rum processed in lead pipes. The victim caught cold and suffered excruciating cramps in the pit of his stomach and bowels. He lost the use of his limbs temporarily or permanently and often died.[9]

Contemporary physicians in the island, such as Dr. Trapham,[10] believed that the dry bellyache was produced by sleeping in the mois-

ture-laden moonshine and recommended frequent tub baths to open the pores and forestall "the griping of the guts."

The clinical description of the dry bellyache of Jamaica is typical of lead poisoning. In 1839, Tanquerel des Planches[11] gave the first modern description of the abdominal pain of lead poisoning, as follows:

> The colic is painful, remitting, periumbilical, epigastric or hypogastric, with a feeling of abdominal constriction during remission. It is followed most frequently by alteration in bowel function, constipation, then diarrhea. The pain is severe causing great agitation.[12]

Lead colic is often the most prominent symptom of plumbism in adults, followed by a motor neuropathy,[13] with minimal sensory signs. Epidemic outbreaks of plumbism continue to occur from time to time, mainly among alcoholic patients who drink "moonshine whiskey."[14] In Jamaica, however, the dry bellyache slowly fell into oblivion.

At the turn of the nineteenth century, Jamaica had established a solid position as the wealthiest and most attractive of the islands of the English West Indies. After 250 years of colonial life the economy continued to revolve around sugar-cane plantations, and health conditions had markedly improved. The old capital of Port Royal had been destroyed by the great earthquake of 7 June 1692,[15] and after 1872 Kingston, the new capital, flourished. In 1888 and 1897, Henry Strachan, Senior Medical Officer in Jamaica, reported 510 cases of "a form of multiple neuritis prevalent in the West Indies,"[16] observed at the Kingston Public Hospital during a period of five years.[17] The disease occurred almost exclusively among blacks; it affected both sexes at any age, but was more common in young adults. Incomplete recovery occurred in the majority of cases and deaths were rare. The clinical description of a typical case is given by Strachan in the following terms:

> A patient presents himself complaining of "numbness and cramps in his hands and feet, dimness of sight, and a tightness round the waist." (He may add to this statement that he fears he is getting "hard of hearing.") He goes on to say that he suffers from severe burning in the palms of the hands and soles of the feet.
>
> On examination it will be seen that there is slight excoriation of the edges of the eyelids, margins of the lips, and around the margins of the nostrils; the palpebral conjunctiva may be hyperaemic, as will be the lips. The heat of the hands complained by the patient will be found to be not merely subjective but appreciable to the touch, and due to a hyperaemic

> condition of the palms; the acuteness of vision for form will be found to be more or less impaired according to the stage to which the malady has progressed; examination of the main nerves to the extremities will show that they are very tender on pressure, especially the ulnar nerve, and along the distribution of their terminal filaments they may be tracked by lines of fine herpetic vesicles.
>
> On admitting such a case to hospital, and watching its further progress, it will be noted that at night the patient will be awake for hours, rubbing his feet and legs, most probably, and moaning with pain. The loss of vision will proceed until he cannot recognize individuals. The muscles of his limbs will waste until the "claw" hand and foot are marked features, and this wasting of muscles and the disappearance of fat will produce emaciation which is very noteworthy in advanced cases. There will be found to be no alteration in the reaction of the pupil to light and accommodation, no falling when the eyes are closed, and the sphincters will not be affected.[18]

All patients walked with a "typically ataxic" gait, and in some there was also involvement of the upper extremities, "any attempts to move resulting in a peculiar aimless jerk."[19] The knee jerks were absent in more than half of the patients (53 percent), exaggerated or subnormal in 23 percent, and normal in the rest. Pain, touch and temperature sensations, "although delayed, were completely absent only in the more severe cases."[20] Retinal hyperemia was noted, but there was no optic atrophy. The skin changes were quite noticeable:

> This desquamation, which is fine and branny, involves the whole of the palm, which becomes more and more deeply pigmented as the disease progresses. Should bullae form and be neglected, small ulcers may result, but this is apparently rare. In the feet the thick epidermis of the soles of such patients as walk barefoot will come off in large flakes, and the soles also will become pigmented. . . . These parts, which are normally the least pigmented external portions of the negroes, become deeply pigmented as the disease progresses, and remain so after it has passed away. . . . The change is most striking to the observer in the regions which are normally fairer than the rest. Then the colour may vary from brown to intense black.[21]

In a few fatal cases resulting from respiratory distress, postmortem examination showed pigmentation of the brain, spinal cord and nerve trunks. Liver and spleen had clear evidence of chronic malaria, and this led the author to believe that malarial pigment was the cause of the disease he called "Malarial Multiple Peripheral Neuritis."[22]

Arsenic Neuropathy

Strachan's syndrome is considered by all authors a nutritional deficiency neuropathy, similar to those observed in Far East prisoners of

war during World War II.* Nevertheless, the clinical picture of burning feet, motor neuropathy and skin pigmentation is typical of arsenic intoxication.[24] It was interesting to discover that during the year 1900 the first precise documentation of the clinical features of chronic arsenic poisoning appeared, resulting from an epidemic of arsenic neuropathy that occurred in northern England, mainly in the cities of Manchester, Salford, and Liverpool, in which 6,000 persons became ill and 70 died after drinking beer contaminated with arsenic.[25]

The clinical features and the cause of the epidemic were beautifully described by Ernest Septimus Reynolds, M.D., F.R.C.P. Lond., in his "account of an epidemic outbreak of arsenical poisoning occurring in beerdrinkers in the north of England and the Midland Counties in 1900."[26] Reynolds noticed a considerable number of cases presenting to the Manchester Workhouse Infirmary and the Manchester Royal Infirmary, with unusual skin lesions, mainly keratosis and pigmentation, diagnosed in some cases as Addison's disease. In June 1900 many cases of "the typical erythromelalgia or painful red neuralgia of Weir Mitchell"[27] began to occur, and during the last seven months of 1900 Reynolds noted:

> . . . an increase in the number of cases of herpes zoster, which appeared to be in epidemic form and during this period I saw probably more cases than I had seen altogether in the past two years. At the beginning of August quite an extraordinary number of cases of so-called "alcoholic paralysis" were admitted. . . . There was at the beginning of November, no longer any doubt that a serious epidemic existed not only in Manchester and Salford but also in the neighbouring towns.[28]

The clinical picture developed in the following sequence: vomiting and diarrhea after the consumption of beer, "furred" or "silvery" tongue, running eyes and nose with puffy eyelids, bronchial irritation and hoarseness, numbness and tingling of hands and feet, followed shortly by the onset of extremely painful "burning feet" or acrodynia. Late findings were the distal muscle atrophies, keratosis with branny desquamation and a severe hyperpigmentation resembling that of Ad-

*During World War II thousands of prisoners of war in the Far East developed signs and symptoms of severe nutritional deficiencies affecting in many cases the central nervous system. The syndrome more commonly observed was a painful neuropathy called "burning feet" or "happy feet."[23] The description of the pain in these cases closely resembles Strachan's own. Other syndromes observed included ataxic neuropathy, impaired vision ("camp blindness"), deafness, dizziness, spastic paraplegia, foot drop, delirium and acute myasthenia. (Author's note)

dison's disease, although the scars and buccal surfaces were not involved.[27]

Reynolds also described the characteristic transverse lines of arsenic poisoning, many years before Mees.[30]*

> In many cases the nails are affected. After the patients have stopped taking the beer for some weeks the best appearances are seen, for then there is a transverse white ridge across the nail; proximal to this the nail is normal, but distal to it the nail is whiter, cracked, thin, and towards the tip almost papery and much flattened.[31]

During the epidemic outbreak it was also Reynolds who observed an unusual number of cases of herpes zoster (a finding noted as well by Strachan[32]) and, remembering this to be a common side effect of arsenical therapy, soon deduced the cause of the epidemic.[33]

Two sources of arsenic were found: first, sulphuric acid obtained from iron pyrites imported from Spain containing arsenic impurities,[34] and second, the sugar used in the brewing. Sulphuric acid contained "more than 1.4% arsenious acid"[35] and was used in the preparation of inverted sugar. The second source of arsenic was the sugar itself.[36] The glucose samples used in the brewing contained 0.5 percent by weight of arsenious acid. Delépine and Tattersall[37] found large amounts of arsenic "in some of the whitest glucose." It was ascertained that all suspected samples of sugar "were purchased from the same firm of sugar manufacturers."[38] It is tempting to speculate whether these two epidemics so closely related in time, one occurring in 1887–97 in tropical Jamaica where sugar was produced, and the other one in late 1900 in England, where sugar from the West Indies was consumed, could be linked to a common source of arsenic to be found in the sugar-cane plantations. Here, according to Barnes,[39] sodium arsenite, arsenic pentoxide, lead and calcium arsenate and copper acetoarsenite (Paris green) were extensively used as weed killers and pesticides.

The Spanish Town Disease

Twenty years later, Henry Harold Scott, Government Bacteriologist in Jamaica,[40] wrote a detailed account of twenty-one patients with neuropathy observed during an epidemic outbreak of a disease known

* Mees's lines are seen not only in arsenic intoxication but also in thallium poisoning and in other medical conditions (R. B. Jenkins. 1963. "Reynolds, Aldrich or Mees? A consideration of transverse striate leukonychia." *Am J Med Sci* 246: 707–709.) (Author's note)

as the *"Spanish Town epidemic"* that appeared early in 1917 among labourers on a sugar plantation, in the neighbourhood of Spanish Town (Santiago or St. Jago de la Vega), the former capital of Jamaica.[41] Patients were adult peasants, males and females being equally affected:

> The condition is also met with in other parts of the island, and, moreover, there is a considerable weight of evidence to support the contention that the "Spanish Town epidemic" represents the acute stage of a disease which, when it has become chronic, has for a long time been designated in Jamaica as "Peripheral Neuritis." . . . The epidemic started during the cutting and carrying of the cane crop, and the reporting of fresh cases ceased almost abruptly as soon as the crop was finished. . . . In practically every instance the first symptom complained of is a sensation of "itching in the eyes." This comes on with comparative suddenness while the patient is at his usual work. In some cases both eyes are attacked at about the same time, in others one eye is affected at first, and after an interval of varied length, from a few (three to four) hours to as many days, similar sensations are felt in the other eye. At this early stage the conjunctiva is congested and there is photophobia, but not of much intensity. Within the next three days or so the conjunctiva, both ocular and palpebral, is in a swollen, red, oedematous condition, the edges of the lids show abrasions, and small superficial ulcers form with discharge of pus.[42]

Within four days to a week, inflammation, burning and aphthae of the mouth appeared. Conjunctivitis and stomatitis cleared up rapidly and no other symptoms were complained of until about fourteen days following the onset of the conjunctivitis when patients developed constipation, numbness, tingling and burning of the feet, but without pain.[43] Of twenty-one patients reported, nine died, eight had severe chronic disease, and the remainder had no neurological deficit. No neurological symptoms developed in several hundred patients who developed the ocular prodromata, but who, instead of constipation, had diarrhea. "In all of those exhibiting nervous symptoms constipation was the rule, and, as a corollary to this, in none of the cases belonging to the preceding class (intestinal cases) did any nervous symptoms develop."[44] Residual symptoms in those affected were dimness of vision, a certain degree of deafness, and "a peculiar steppage of gait, but without foot drop, an exaggeration of movement of the legs but without the tabetic stamp."[45] The notable skin changes described by Strachan[46] were not described by Scott.[47] Mild anemia, from hookworms and malaria, and a consistent lymphocytosis were noted in most cases. Serum and cerebrospinal fluid Wassermann reactions were negative.[48]

A thorough postmortem examination[49] was made in two cases who died in about seven weeks. There was significant damage to the pos-

terior columns from the cervical to the lumbosacral regions, with active demyelination and presence of fat-laden macrophages. The spinocerebellar tracts showed a similar degree of degeneration. The lateral corticospinal tracts were spared. Posterior roots were degenerated at all levels, and dorsal root ganglia showed advanced changes of fatty degeneration. The fibers of the optic nerve were extensively affected, and minimal changes were present in the auditory nerves. Sciatic, median, and ulnar nerves were relatively spared. In an erudite discussion Scott[50] demonstrated that his cases were not instances of pellagra, because of the absence of dermatitis, early diarrhea, and mental changes. Furthermore, he did not observe the typical changes of Betz's giant pyramidal cells described in the neuropathology of pellagra. He also excluded beriberi[51] because of the absence of edema, cardiac symptoms, muscle tenderness and atrophy, and because of the minimal involvement of the peripheral nerves found at autopsy. He considered that the problem was not caused by malnutrition, since the diet was adequate in most of his patients, "consisting of yam, breadfruit, cocoa, beans, cornmeal, and salt-fish, although during the crop most of them were living almost exclusively on cane."[52] He concluded that the most likely cause was an intoxication.[53]

Sugarcane is indeed cyanogenetic.[54] However, despite Scott's conclusion, although the neurological picture in some aspects resembles that of arsenic poisoning,[55] and even notwithstanding the fact that a single autopsy report described degeneration of the dorsal columns in a severe case of arsenic neuropathy,[56] the "Spanish Town Epidemic"[57] is clinically a typical postinfectious acute sensory neuronopathy[58] (a condition described only in 1980), occurring during an epidemic outbreak of a viral infection, acute hemorrhagic conjunctivitis.[59]

Acute Hemorrhagic Conjunctivitis

Outbreaks of acute hemorrhagic conjunctivitis have been well documented in the West Indies. The best known episode[60] involved a French slave ship of 200 tons, *Le Rôdeur,* which left the coast of Nigeria on 6 April 1819 with a cargo of 160 slaves and a crew of 22 men with destination to Guadeloupe in the French West Indies. On her course for fifteen days and near the equator some of the slaves were brought up on deck and considerable redness of their eyes was noticed. Treatment was ordered with an infusion of elder flowers, but some of the

slaves, frightened, threw themselves into the sea and drowned, and the treatment was stopped. In a short time the ophthalmia spread throughout the entire cargo of slaves, and in the course of three days the captain and all members of the crew showed symptoms. On awakening in the morning they felt a slight pricking and itching of the eyelids, accompanied by redness and edema of the eyes. The following day the swelling and the redness increased and the pain sharpened. Trying to control the inflammation, sailors applied poultices of hot rice to the eye, probably producing a secondary bacterial infection since soon an abundant, thick, greenish and purulent discharge appeared. At the height of the epidemic the captain and all members of the crew, except one, were blinded with the ophthalmia and the ship lay still. At this point *Le Rôdeur* crossed courses with a Spanish ship, the *León,* and her crew was affected by the ophthalmia to an even greater degree. With gradual recovery of some of the crew members, *Le Rôdeur* finally reached the island of Guadeloupe on 21 June 1819. The problem rapidly improved with a simple lotion of spring water and lemon juice prescribed by a Negro slave woman. Of the original twenty-two crew members, twelve were totally blind; five, including the captain, lost the sight in one eye; and four men were left with corneal opacities. Of the slaves who survived the trip, thirty-nine were totally blind, twelve were blind in one eye, and fourteen others had corneal opacities.

During the recent pandemic of acute hemorrhagic conjunctivitis,[61] neurological complications were described in Bombay,[62] Taiwan,[63] and Panama.[64] The neurovirulence of the causal agent, enterovirus 70, was demonstrated by intracerebral inoculation in monkeys.[65] The epidemic character of the outbreak described in 1917 by Scott in Jamaica, the acute and prominent ophthalmic involvement with fiery red eye, the latent period that elapsed between the ophthalmia and the onset of neurological symptoms, and the resemblance of the clinical picture to that of the acute sensory neuronopathy syndrome, are all in favor of the postinfectious nature of Jamaican neuropathy following an epidemic of viral conjunctivitis.

More recently, in 1956, Cruickshank[66] described one hundred patients with "a neuropathic syndrome of uncertain origin," yet another form of Jamaican neuropathy. This, however, is contemporary history still under intensive research.

Conclusion

In summary, a nutritional origin as the sole cause of the numerous neuropathies described in Jamaica since colonial days is highly unlikely. It is probable that neurotoxins could have been the cause of the dry gripes and of Strachan's cases. A postinfectious origin is compatible with the epidemiological characteristics and the clinical presentation of the outbreak of ataxic neuropathy described by Scott. It can also be seen from this analysis that the entities described by these two authors are clearly different in their clinical features and probable causes. For this reason, the use of the term "Strachan-Scott syndrome," suggested by Knuttgen[67] to unify them, is not warranted and should be discouraged.

Department of Medical and Surgical Neurology
Texas Tech University Health Sciences Center,
School of Medicine
Department of Medical and Surgical Neurology
Lubbock, Texas 79430

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Medicine Through the Lens of the Museum

AUDREY B. DAVIS

The medical care community has focused on its history and current practices through a variety of museum lenses; or, if we upgrade the lens and call it a gem, we could say that the gem contains multiple facets. The three major categories of museum lenses are: instrument and object collections, exhibitions, and research that appears in publications for the general and scholarly reader. The lenses, or gem facets, for each of these categories differ and appear more or less transparent, depending on who is peering through them and what they are focused on. They may or may not attract and inform medical colleagues or members of the lay public. Of the three categories, exhibitions offer a unique potential for appealing to a large audience and for making statements about medicine in ways that the other categories do not match or duplicate. Exhibitions "capture a moment in time, halting its progress, permitting one to savor the moment, question its significance and explore its ramifications. They provide contrast and offer an opportunity to experience history."[1]

To install these exhibits requires a great amount of preparation through research in the history of all aspects of medicine, and the observations made should be varied, inclusive and applied from the beginning of a project. For instance, my own current research is on the history of Visiting Nurse Associations in the United States. This year some of the oldest VNAs are celebrating their centennial anniversaries, the first of which is in Buffalo. In addition to a study of their archives I will select photographs, illustrations, annual reports, brochures, artifacts and uniforms to be used in a traveling exhibition. The exhibit and illustrated catalog may be supplemented with locally available materials.

Among the numerous approaches through exhibits, the one that is most perfected through use over centuries consists of a display of gross specimens and models. This practical approach provides sound,

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ever-essential images each generation of medical students must learn before trying out other methods. Since it is familiar to all of us in many institutions, of which the most well known include the Hunterian Collection of the Royal College of Surgeons in England, the Armed Forces Institute of Pathology in Washington, D.C., and the renovated Mütter Museum in Philadelphia, I would like to lay this lens aside and discuss a few other exhibits that are less sophisticated but that serve a greater variety of spectators.

One lens, to return to our analogy, is tinted to transmit the disparate medical practices of ancient cultures and periods different from our own. Occasionally the lens is so shaped as to distort. The reason was described in 1926 by Sir Arthur Keith: "The evolution of the history of medicine is more difficult than any other branch of knowledge since the trend of evolution is nearly always toward complication, but in medicine it is otherwise; even amongst the most primitive races of mankind, we find that the practice of medicine is founded on an elaborate code of beliefs; these beliefs are the fine-drawn gossamer of savage fancy — altogether too delicate threads for the clumsy fingers of museum curators to touch."[2] Objects from other cultures, shown in isolation from their context and function, seem mysterious and occasionally alien, especially when poorly labeled. Objects make statements but do not answer all questions. Labels, photographs and graphics suggest interpretations and place objects in context.

Exhibitions of artifacts, objects, photographs and graphics may make statements that other media cannot make as effectively or to as many people. An exhibition draws the attention of individuals by the intimacy it encourages between viewer and subject, imparting reality and appealing to a viewer's imagination. Stimulated by the sights, sounds, smells, colors and touches of their antecedents, a museum visitor is able to perceive historical realities and understand attitudes and emotions of a bygone era.

Early Exhibits

Exhibition of medical instruments and objects began on a large scale in the eighteenth and nineteenth centuries through trade shows and fairs. Manufacturers contributed to displays that lasted from a few days to a few months, notably the British Medical Association and the American Medical Association during the nineteenth century. Among those offering the most handsome and respected instruments were

Charriére of Paris, Arnold and Sons of London, George Tiemann of New York and the S. S. White Dental Company of Philadelphia. From these exhibitions and fairs came the collections and exhibitions of the first science-technology museums, established to acquire and preserve the scientific-technological heritage of Western civilization and to exhibit the construction and use of instruments to the "workingman" of the day. Their message was limited. "The items displayed seldom painted a picture of the economic, cultural or social forces that were at play during the industrial revolution and therefore provided the visitor with little insight into the rich environment in which these technological advances were experienced by the people living through that age."[3] The Deutsches Museum (1903) and the Science Museums in Chicago and Philadelphia serve as examples of such exhibits.

During this early period the medical and dental professions opposed participation in such ventures by physicians, surgeons and dentists. Exhibition of their tools and appliances was thought to be inappropriate and was the subject of many scandalous caricatures in France and England. The first major exhibition of the nineteenth century in the Crystal Palace in London (1851) aroused prompt criticism. A commentator remarked on an artificial silver nose invented and exhibited by Mr. Whitehouse: "We will not pronounce rashly upon this; but it strikes us that all artificial noses, both in shape, size, and the amount of nose required, will depend upon the amount wanting in an individual . . . the material also of which the nose is manufactured would have to be regulated by the special circumstances."[4]

Dr. Thomas Evans, surgeon-dentist of Philadelphia and a U.S. Commissioner and member of the Jury of the International Exhibition at Champs-de-Mars, Paris, pointedly inquired: "Can or should the Surgeon-dentist exhibit under the same title or claim as an artist or a manufacturer? When the manufacturer exhibits the product of his trade, when the artisan exposes what he has formed with his hand, when the artist exhibits the picture which he has painted, . . . they all present . . . things whose merits may be determined, . . . which in themselves demonstrate clearly the skill, intelligence, the talent or genius of their authors. But what can the dentist exhibit, in an incontestable manner, [to show] the superiority of his operations? Does not the dentist who exhibits find himself in exactly the same position as the surgeon who would pretend to prove his professional superiority by exposing the leg which he had amputated by the side of an artificial

one that he had furnished the patient with?" Continuing, Evans noted that, unlike their European counterparts, American and English dentists did not exhibit their mechanical creations, and he attributed such restraint "to the influence exercised upon them by the instruction which they receive in the special schools of dental surgery; schools where the value and dignity of their profession has been inculcated."[5]

After World War II a new form of museum, the science center, developed. This offered a unique experience for the nonspecialist to play with scientific and technological devices and to learn their governing principles. The instruments were not historical, nor were they displayed to convey a historical concept. The Exploratorium in San Francisco is the best example of a science center in the United States. Recently, some museum scholars, Orchiston and Bhathal from Australia, have suggested the creation of a "science centrum" that combines exhibition of historical collections with participatory, engaging exhibits of the science center; this may, if carried out, provide a bridge between the science-technology museum of the future and institutions of the past.

Wellcome Medical Museum at the London Science Museum

The exhibit containing the largest medical collection in London, and stored in the Science Museum, opened in December 1981. This exhibit contains selected instruments, devices, artifacts, sculptures, icons and furnishings collected by a pharmacist, Henry Solomon Wellcome (1853–1936). Wellcome was born in Minnesota, was graduated from the Philadelphia College of Pharmacy in 1874, and was employed by several United States pharmaceutical manufacturers before emigrating to London. His wealth, derived from the discovery and marketing of a number of successful drugs, permitted him to collect a wide range of historical, archeological, anthropological and artistic objects pertinent to the history and culture of medicine from antiquity through the twentieth century. He spent £400,000 on books and objects and, beginning in 1896, employed a staff to collect and study them.[6]

An example of his voracious collecting appetite was his purchase of 100,000 American patent models in 1926 for $6,540, most of which were not of a medical or pharmaceutical nature. This year a foundation has been created to raise 17 million dollars to reacquire models that Wellcome once owned and that were sold by his trust. The funds will

be used to house, conserve and study the patent models. The Burroughs-Wellcome Foundation has contributed $250,000 toward this goal.

Wellcome invested heavily in medical collections and exhibitions to depict the history of medicine in his belief that history could have practical consequences. Medicine, he declared, "has a history which has touched every phase of life and art, and is, to a large extent, bound up with the records of human existence from the earliest times. By its study, fresh fields of medical research are suggested, and the interest in others, still undeveloped, is stimulated."[7]

His collection includes 1,600 microscopes, 10,000 microscopic slides, 40,000 surgical instruments, 7,000 coins and medals, thousands of spectacles, 10,000 drugs, and 1,500 pieces of Roman and Islamic medical and pharmaceutical ceramics. These were first exhibited in 1913 in London in the company headquarters on Wigmore Street and in 1931 in a building on Euston Road. Over the years, selected objects were displayed and, during the 1950s, representative specimens and dioramas in cases. Later, the medical collections and exhibits were transferred to the Science Museum, now arranged into two segments for students and lay public and for the medical and scholarly visitor.[8] A map of the exhibit at the entrance guides the visitor. Some striking items displayed are the Chinese pan and brazier used to detect poison by heating the food and stirring it with an ivory spatula, which, if it turned black, indicated that the food was poisonous. Nearby is a Chinese doctor's signboard with twenty cords, each strung with twenty-four human teeth. The sign announces, "Doctor for treating miscellaneous diseases." Other Chinese items include constipation rollers, acupuncture models and needles, and a moxibustion set.

Among European artifacts, an iron mortsafe reminds the visitor of past grave-robbing episodes, recalling a time when coffins were placed in these safes for a few months, until the body had decayed enough so that it could no longer be used for dissection in a medical school. The richness of the collection is further revealed in such objects as statues of saints, specifically those who were noted for their protection against diseases and accidents, among them Saint Apollonia (toothache) and Saint Hervé (eye ailments).

Tools used to make some of the fundamental scientific discoveries of the nineteenth century sometimes surprise the viewer. Baron Joseph Lister's laboratory glassware, which he used in conducting his

experiments on antisepsis, we discover, were ordinary sherry glasses.

Howard Dittrick Museum of Historical Medicine

The Howard Dittrick Museum of Historical Medicine in Cleveland, Ohio, collects, primarily, objects and artifacts from the Western Reserve region, then, objects from other parts of the United States, and finally, items of European origin. Its nucleus was established in 1906 when space was provided in the Cleveland Medical Library to store and exhibit instruments, papers and mementos that had been donated by Dr. Dudley Peter Allen, commemorating the medical careers of four generations of his ancestors. Other physicians contributed additional materials.

Dr. Howard Dittrick, a physician with a personal interest in medical collections, was put in charge of the museum, since situated in the Medical Library on Euclid Avenue. He and his wife collected, labeled and recorded objects that by 1926 numbered 676. In 1928 they visited museums in Europe, collecting such items as sixteenth-century orthopaedic appliances and a collection of mortars and pestles. By 1930 Dr. Dittrick calculated that the Cleveland Medical Museum was exceeded in size only by those in Zurich and London. In 1936 medical objects from the collection were exhibited to the public for the first time, and by 1944 Dittrick's success had become such that the museum was named in his honor.[9]

Other local medical museums include the Country Doctor Museum in North Carolina; the Medical Museum of the Knoxville Academy of Medicine in Tennessee; the Joseph Waring Medical Museum in Charleston, South Carolina; the medical museum in Galveston, Texas; Davidge Hall, the oldest continually used medical lecture hall of the University of Maryland in Baltimore; and a number of artifact collections deposited in medical libraries across the United States.

Special Medical Exhibitions, Boston Medical Society

Special exhibitions are found in many museums. "In Sickness and Health: American Patients and Doctors, 1700–1900," was arranged cooperatively in 1981 by the Massachusetts Medical Society and the Masons' Museum of Our National Heritage in Lexington, Massachusetts. It is important for its genesis as an educational venture between the Massachusetts Medical Society and a private museum not restricted to historical medical exhibits. Its collection is arranged to

reveal the role played by sickness and disease in colonial America, when one half of the populace had died by the age of twenty-seven, mostly of infectious diseases. Relics of the major diseases suffered in this period—smallpox, cholera, diphtheria, tuberculosis, bloody flux, dropsy, and gout—are all illustrated. Various themes reveal the public's response to harsh remedies prescribed by physicians, which often led to a patient's rejection of recommended treatment and the use of milder remedies. After 1820, sectarian medicine, developed by laymen and laywomen, flourished in such forms as thomsonianism, homeopathy, hydropathy, phrenology, and electrotherapy. The script for this exhibit conveys the message of those who believe that historical museums must broaden the scope of exhibits, as one commentator inquired: "But what do we know of the role of anxiety, pain, disease, sex and death in American history? We still need artifacts, exhibitions, and skillful history museum historians to help us experience something of the isolation, the monotony, the scarcities, the boredom and the high mortality rate of a frontier prairie existence."[11]

This New England exhibit includes a mourning badge of 1886, a tea set (1790–1820) decorated with cows to commemorate the development of a smallpox vaccine from cowpox, and a certificate of inoculation signed in 1764 by Thomas Hartley.

Pain and Its Relief, National Museum of American History

A special challenge to workers in this field is the graphic depiction of human pain, a problem explored in an exhibition in October 1983 at the National Museum of American History and entitled *Pain and Its Relief.*[12] Its first section displays artifacts related to the methods and rituals other cultures have applied to cope with pain, such as tribal and medical fetishes. The next section tells the story of the discovery of ether and nitrous oxide by William Morton, Horace Wells, and Crawford Long. It presents documents describing the surgical tools and methods used before the advent of anesthesia, early methods of applying ether, nitrous oxide and chloroform, and the long bitter controversy over the discovery of these epoch-making medical drugs. One section, devoted to analgesics and anesthetics, suggests the growing emphasis on pain relief in American society.

*M*A*S*H* at National Museum of American History*

A most successful medical exhibition recently was mounted in an unusual lens and provided a unique experience for those who came to view it.[13] The National Museum of American History's display of souvenirs of the decade-long popular television show M*A*S*H*, which featured battlefield medicine, illustrates how important recognition and association are in enticing people to museums. The content of the exhibit, as in the original TV drama, was extensive, and the public was not spared a view of such distressing items as blood-stained pads, bandages and other medical items which other public exhibits avoid. This most successful exhibit even spawned a lucrative industry — a separate booth selling souvenirs with the M*A*S*H* logo.

Such a response of the public tells us that exhibits must be allowed to take their own special direction in reaching an audience and should not be judged by rigid standards. Thomas J. Schlereth, Director of American Studies at the University of Notre Dame, has offered appropriate guidelines, such as: Is the exhibit biographical, topical, thematic or chronological? Is the proportion of objects allotted to each subject adequate? Does the exhibit engage one's historical interest and raise important historical questions? Does it communicate the present state of research on a topic and illustrate current efforts to expand research knowledge on the subject? Does the arrangement of objects transmit or distort historical information and insight?

Three Hundred Years of Medicine in New Jersey

A recent exhibit of medical history in Piscataway, New Jersey (October 1984 to January 1985) was entitled "300 Years of Medicine in New Jersey: The Science and Art of Healing." It contained 800 specimens arranged in dioramas of a doctor's office, an early twentieth-century dentist's office and hospital wards to illustrate the gradual progression toward modern medicine. Equipment for specialized services such as geriatrics, high-risk infants and maternity care was on view. A *New York Times* reviewer commented that "emphasis is on the evolution of modern medical practice from its not-too-distant antecedents. The contrast is a powerful and moving counterpoint to how far medicine has progressed and how profoundly society has been affected."[14]

Nontraditional Medicine

Exhibitions of American medicine share a common character that stems from the objects and artifacts available to the planners, one underlying assumption being the advance of scientific medicine through science and technology since the eighteenth century. Few items are included to illustrate folk medicine and nontraditional methods of treating diseases; and even when nontraditional medicine is included, the tendency is to elevate or rank scientific medicine as foremost and correct, and to treat other forms of healing as minor or inconsequential. There was the intimation that when scientific medicine failed, other forms of treatment were applied in desperation.

Chiropractic and osteopathic medicine, which are among America's original contributions to health care, are included in one of these American medicine exhibits. Homeopathy fares a little better. Should these forms of medicine be exhibited together with scientific, laboratory and hospital-based medicine? After a small exhibit was mounted in 1978, supporters of chiropractic argued strongly for a major exhibit on the history of their specialty in the National Museum of American History. In fact, the anthropologist and historian, Robert Anderson, has stated that "chiropractic should be featured in a museum whose purpose is to inform Americans of their heritage" and has suggested that "the impact of irregular practitioners upon regular medical practice should be recounted as the story of how spinal manipulative techniques were rejected and denigrated in the case of chiropractors, coopted and ignored in the case of osteopaths, and infiltrated as a medical fifth column in the case of medical doctors practicing what is now termed manipulative or manual medicine."[15] Coming to grips with Professor Anderson's statement in an exhibit would stimulate interesting discussion between medical professionals and the lay public.

Exhibits as Assessments

It has been my experience that physicians and dentists, through their professional societies and associations, approach a museum when they want to celebrate an anniversary, arrange a special meeting or add an unusual event to their annual meeting. Nurses, medical technologists and others rarely come to the museum to request an exhibition. The request that medical societies usually make is for an

exhibition that extols the accomplishments of the association's members, including a celebration of their founders and of members' innovations. It has not occurred to these professional groups that the social nature of medicine may be conveyed within the framework of history and the approach to past events with real data, implements and artifacts. Facing up to a past that includes unanswered questions, less than successful procedures, or ignorance of natural processes should not be taboo in a public medical exhibition oriented toward history. Progress need not, and often should not, be the underlying theme. Historical treatment of medical theory and practice does not assume progression toward a defined goal but rather, change in ideas, beliefs and behaviors and in the use of tools. The conceptual and historical approach indicated in the type of medical exhibition I am suggesting, be it large or small, would surely be enhanced by the contributions of the practicing medical community. There may be other benefits as well. When approached historically, controversial issues and unsolved problems gain a perspective and even a sympathy, otherwise elusive. For example, the issue of prolonging life with extraordinary means, leaving a patient bedridden or unable to care for himself or herself, may be considered in contrast to the attitudes toward the earlier care of the disabled when technological devices, apparatus and implements did not exist or were available to only a few. What lessons may be learned in contemplating the life of an amputee a few years ago when transportation was difficult and caring for oneself required strenuous physical effort without aids and devices to lessen everyday chores? What were the predicaments of a blind, deaf or handicapped person in a society in which disability was regarded as serious and was often attributed to moral deficiency? The need to cover up artificial limbs and to hide impairments was expected among some classes, and, for purely cosmetic reasons, artificial hands were fashioned of normal shape although the claw was, and still is, the most functionally useful artificial hand. To give visitors a chance to experience some of the limitations of a handicapped, a few years ago the Boston Children's Museum created an exhibit featuring a wheelchair, a walker, crutches, casts, prosthetic arms and other tools made available to visitors.

Conclusion

Physicians, nurses, dentists, medical technologists, as well as other visitors, often regard museums as recreational kaleidoscopes rather than educational instruments. The expectation of fun and relaxation during a museum visit lures the visitor from conscious awareness of the museum's tremendous role in information dissemination, and the evolution of such ideas as controversy and novelty in problem solving. The ideas of two individuals whose statements appeared within the last fifty-five years seem pertinent, although neither goal of these commentators has been achieved. In 1929 S. H. Daukes, who helped develop the Wellcome Medical Museum, wrote: "As years go by and knowledge grows, the Museum must play an increasingly important part in medical education. Medicine is becoming a mosaic of specialties—therefore it is essential that the student have a centre where he can view the subject as a whole and fit the various sections of the puzzle together. Such a centre can be supplied by the Medical Museum, provided it is suitably arranged."[16] In 1984 Wolfgang Jacobiet summarized the need for rethinking exhibits. Although his topic was agriculture, his remarks apply to medical exhibits: "Merely expanding the scope and methods of agricultural museology will not be enough. To an even greater degree, a thoroughgoing conceptual reappraisal is called for . . . it is urgently necessary to create a new type of museum, which has not yet been conceptualized. This type of museum would have an interdisciplinary basis."[17]

It is time to take up the challenge of designing exhibitions that make social, cultural and medical statements in the three-dimensional world of objects, especially original specimens and instruments. One value of a socially focused historical exhibition lies in its appeal and ability to engage people in ways that are not specialized or technical.

National Museum of American History
Smithsonian Institution
Washington, D.C. 20560

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A.B.D.

National Museum of American History
Smithsonian Institution
Washington, D.C. 20560

REVIEW

LOOSE, H.; ASSCHER, A.; and ANDRIOLI, V., eds. *Pyelonephritis,* Volume V. 179 pp., illus. New York: Thieme-Stratton, 1984. Price $30.00.

Reviewed by SUSAN H. BRAY

The Fifth International Symposium on Pyelonephritis, held in 1983, produced a number of fine papers by an even larger number of respected investigators in the field of urinary tract infections. *Pyelonephritis* is a volume with contributions from 83 authors. The book is divided into sections designed to cover the broad area of urinary tract infection. These are: Pathophysiology, Diagnosis, Epidemiology and Natural History, and Treatment.

Some of the discussion is quite succinct and may be too much so unless one is very well acquainted with research efforts in the area of urinary tract infection. Other papers are quite well written and should be useful as learning tools; they contain excellent lists and fine illustrations. Apparently, some of the presentations were in German; these have been translated, but the English language does not flow smoothly.

Several research studies are discussed in detail. Though interesting, they should not be interpreted as state of the art fact as they are reports of individual research efforts. There is much discussion of possible immunologic mechanisms at work in experimental pyelonephritis. These papers have excellent graphics to better help the physician perhaps not well versed in immunology to understand what is being presented.

The chapter outlining diagnostic methods is concise and describes well the use of radionuclide cystography in all its aspects. The discussion of natural history and epidemiology includes clinical studies attempting to demonstrate that progressive scarring will occur and is associated with a decrease in renal function in asymptomatic children with pyelonephritis. There remains uncertainty whether vesical ureteral reflux alone causes further damage to renal function. There are a number of sophisticated microbiologic studies devoted to better defining pathogenesis. There is a good discussion of new antibiotics and their pharmacokinetics, including newer ways of administration.

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An excellent chapter by Robert Heptinstall discusses current views on interstitial nephritis and its pathophysiology.

In the section on Epidemiology and Natural History, M. Bonadio, et al., consider urinary tract infection in women with controlled diabetes. Interestingly, the authors conclude that in the controlled diabetic female it is difficult to prove that urinary tract infection is more frequent than in nondiabetic patients. Also, they show that the prevalence of urinary tract infection does not correlate with the presence of retinopathy, with the duration of disease, or with the presence of high blood pressure. They offer a rather detailed discussion of why they come to that conclusion.

The symposium papers presented by a group of American and European investigators are well written and are interestingly presented. And yet, I think that the book will be useful to a limited number of physicians, particularly those involved in the fields of pathology, urology, infectious disease and nephrology. For these particular groups, the book could be useful and I would recommend it.

86 Bethlehem Pike
Philadelphia, PA 19118

Luther Leonidas Terry
1911–1985

JONATHAN E. RHOADS

Luther Leonidas Terry, a distinguished member of The College of Physicians of Philadelphia and of the American medical community, was born on September 15, 1911, in Red Level, Alabama, and died in Philadelphia on March 29, 1985. He rose through the United States Public Health Service to become Surgeon General in 1961 and served in this capacity for four years. During this time he accepted the responsibility of warning the American public officially of the dangers of cigarette smoking. This resulted in the legal requirement that every pack of cigarettes should have on it the warning statement, "The Surgeon General has determined that cigarette smoking is dangerous to your health." Thus, while there has been a succession of persons appointed as Surgeon General who have backed this statement, it was Luther Terry who risked the ire of the tobacco industry by coming out boldly to warn the public against smoking and by helping to push this legislation through. How many lives may have been saved by this warning it is impossible to say, but the rate of increase of cigarette smoking was definitely reduced and the incidence of persons who smoke has now begun to decline. It has truly been said that preventive medicine has no grateful patients. Perhaps it is more accurate to say that those who should be grateful cannot identify themselves.

Dr. Terry earned his B.S. degree at Birmingham Southern College in 1931 and an M.D. at Tulane University in 1935. He was subsequently the recipient of twelve honorary doctorate degrees. He interned at the Hillman Hospital in Alabama and in 1937–38 became an Assistant Resident in Medicine at the University Hospitals in Cleveland and Resident in Medicine at Cleveland's City Hospital. He then served an internship in pathology before becoming Instructor and Research Fellow in Medicine at Washington University in St. Louis from 1939 to 1940, moving from there to the University of Texas in Galveston, where he became, successively, Assistant Professor and Associate Professor. His next appointment was as an Instructor in Medicine at Johns Hopkins Medical School, where he served for nine years before being named Assistant Professor in 1953. This appointment continued until 1961.

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Dr. Terry had been a member of the staff of the U.S. Public Health Service Hospital in Baltimore in 1942–1943 and was Chief of the Service there from 1943 to 1953. In 1950 he became Chief of the Clinic in General Medicine and Experimental Therapeutics at the National Heart Institute in Bethesda, occupying that post until 1958. He was Assistant Director for three years and then Surgeon General from 1961 to 1965. At that point he left full-time government service to become Vice President for Medical Affairs at the University of Pennsylvania. He served in that capacity for six years, as Professor of Medicine from 1965 to 1975 and Professor of Community Medicine for the same period of time. He held the title of Adjunct Professor from 1975 to 1982 and Emeritus Professor in 1982. From 1980 to 1983 he served as Corporate Vice President for Medical Affairs for ARA Services and remained with that firm as a consultant.

He accepted many government assignments: Chairman of the Medical Board of the Clinical Center; Director of the Residents Training Program for the National Heart Institute; Chairman of the Cardiovascular Research Training Committee; member of the Advisory Committee on Nutrition in the Division of Indian Health; and Chief U.S. Delegate to the World Health Organization. He was a member of the Advisory Board of the Leonard Wood Memorial Institute for Nutritional Sciences at Columbia University and was a Public Trustee of the Nutrition Foundation. In 1965 he was awarded the George B. Glendenning Memorial Award of the Washington Dental Society, in the same year the Distinguished Service Medal of the U.S. Public Health Service, and in 1973 an Honorary Mastership of the American College of Physicians. He received the Robert Bruce Award of the American College of Cardiology in 1965. He was past President of the Public Health Service Clinical Society and won other honors too numerous to list.

Luther Terry came to Philadelphia to serve the University of Pennsylvania as Vice President for Medical Affairs and in this role was responsible for the operations not only of the School of Medicine but the then Graduate School of Medicine, the School of Nursing, the School of Allied Medical Sciences, the School of Dentistry and the School of Veterinary Medicine. With these responsibilities he managed some 40 percent of the University budget, reporting to the Provost of the University on educational matters and directly to the President when budgets were under consideration.

In 1940 he married Beryl Janet Reynolds, who, with their three children, Janet Reynolds Kollock, Luther Leonidas Terry and Michael D. Terry, all survive him.

Dr. Terry was active in the affairs of the College of Physicians of Philadelphia. While he served this and many other institutions with distinction, undoubtedly he will be remembered longest for his courageous stand in warning the American people of the dangers of cigarette smoking, and although this fight is far from over, real progress has been made. If the medical profession is in any sense a bellwether, cigarette smoking is bound to diminish and it is to be hoped that the epidemic of lung cancer and coronary heart disease that we are witnessing will come to an end or at least abate.

We must cherish his memory as a Surgeon General of the United States who made his office count for so much.

3400 Spruce Street
Philadelphia, PA 19104

DEPARTMENT OF RETROSPECTION

A Study of the Clinical "We"

E. B. WHITE

A recent article on grammar, which I read in a magazine, has led me to the preparation of a paper on the clinical "we." The clinical "we" is a bedside form in use among practical nurses, who find, in the sound of the plural, a little of the faded romance which still attaches to life. It is also used universally by baby nurses, who think of themselves in groups of four.

Unlike the editorial "we," which is a literary device used to protect writers from the fumes of their own work, the clinical "we" is simply a spoken form, and is rarely written. A baby nurse employs the "we" in the belief that no single person could have as much special knowledge as she has, and that therefore when she speaks it must be three other people too. Thus, when I once asked a baby nurse if she wouldn't please put a hat on my son before she took him out in a sandstorm which happened to be raging at the moment, her reply was: "We never put hats on him after June first." "You and who else don't?" I remember answering. It was my first clash with the clinical "we."

Since then I have studied it, not only in baby nurses but in dentists' assistants, ward witches, and the developers of X-ray plates. It is common to all of them, but hospital nurses use it to denote the patient, not the nurse. I know of one hospital case in which the sudden use of the clinical "we," in the presence of an elderly gentleman convalescing from an operation, threw him into a paroxysm which proved a serious setback to his recovery. It was early in the morning, and a pretty little Southern nurse, coming into his room, sang out: "We didn't change our pajamas this morning, did we?"

"No, let's do it right now!" replied the aged patient somewhat bitterly. The wry joke so excited him that he had to be given a sedative, and later a talking to.

It is probably apparent from the above examples that the clinical "we" can seldom be taken lying down, but almost always provokes a rejoinder. In hospitals the "we" is merely an unattractive figure of speech in a world of strange and unattractive details, but in the home it is intolerable. To live under the same roof with a user of the "we" is

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a fairly good test of a man's character. During the winter of 1931 I employed twenty-two baby nurses, one after another, before I found one who could make a sentence beginning with the word "I." I used to call them "we-uns." Every morning I would go upstairs to the nursery. "Morning, Nurse," I would say, "how you feeling?"

"We are just fine, sir," would be the courteous but silly reply.

"Canst make a sentence beginning with the word 'I'?" I would ask.

"We never make sentences that-a-way, sir," she would blush. So I would fire her and get another. Finally a little Irish girl named McGheogheoghan (pronounced McVeigh) came along, and one morning I went up and asked her how she was feeling.

"I feel terrible," she answered.

That nurse is still with us, and grows, I am happy to say, more singular every day.

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ACADEMIA

Items of Interest from Philadelphia Medical Centers

Hahnemann University. The 1985 Volvo Award for research concerning injuries to the central nervous system was recently accepted by *Perry Black, M.D.,* professor and chairman of the department of neurosurgery.

Arnold T. Berman, M.D., professor and chairman, department of orthopedic surgery and rehabilitation, has been elected to the Board of Trustees.

James B. Couch, M.D., J.D. has been named director of Health and Medical Sciences.

The appointment has been announced of *Harris R. Clearfield, M.D.* as interim chairman of the department of medicine. *It was incorrectly stated in the September issue of this journal that the appointment had been made at another institution.*

Thomas Jefferson University. *Frederick B. Wagner, Jr., M.D.,* has been elected to the University's board of trustees.

Richard Rothman, M.D., Ph.D., has been named James Edwards Professor of Orthopedic Surgery and chairman of the department of orthopedic surgery at Jefferson Medical College, effective on January 1, 1986.

Announcement has been made of the establishment of the Louis and Bess Stein Professorship of Pediatrics. The first Stein Professor is to be *Robert L. Brent, M.D., Ph.D.,* director of the Stein Research Center for research in developmental biology and radiation biology.

Darwin J. Prockop, M.D., Ph.D., will direct the new Jefferson Institute of Molecular Medicine, the principal task of which will be the use of new technologies of "gene splicing" or "recombinant DNA" in studying the role of human genes in rare and common diseases.

James E. Fish, M.D. is to serve as professor of medicine and director of the division of pulmonary medicine.

Paul S. Nemetz, M.D., has been appointed professor of psychiatry and director of adult inpatient psychiatry.

University of Pennsylvania Health Institutions: *Michael E. Selzer, M.D.,* associate professor of neurology, has been named "Doctor of the Year" by the American Paralysis Association.

John J. Mikuta, M.D., has been named the first Franklin Payne Professor of Gynecology/Oncology.

Funded by a special grant, studies have been begun by *Donald B. Martin, M.D.,* to determine factors that govern the development of complications of diabetes. In a related field, the Pennsylvania Department of Health has issued a certificate of need to the hospital for performing transplant opera-

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tions on the pancreas and islets.

Research facilities at the school of medicine and hospital will benefit under the terms of a long-term agreement signed with the Howard Hughes Institute. The aims of the project are "the promotion of human knowledge within the field of the basic sciences . . . and the effective application thereof for the benefit of mankind."

Leonard Jarrett, M.D., has been named the first incumbent of a new chair in pathology honoring *Simon Flexner, M.D.*

The School of Nursing recently celebrated its 50th anniversary of the baccalaureate program for nurses.

Martin S. Greenberg, D.D.S., will be the principal investigator of a project to study herpes simplex infections in patients with decreased resistance to infection.

The Medical College of Pennsylvania. *Steven J. Peitzman, M.D.,* and *Jane M. Glick, Ph.D.,* have been awarded the Christian R. and Mary F. Lindback awards for excellence in clinical teaching and the teaching of basic sciences.

Bernard Sigel, M.D., has been appointed chairman of the department of surgery. Dr. Sigel is currently professor of surgery and chief of the division of biomedical engineering at the College of Medicine of the University of Illinois in Chicago.

The newly elected president of the medical/dental staff is *Frank I. Marlowe, M.D.,* professor of surgery (otolaryngology and head and neck surgery).

At its recent meeting the University Association for Emergency Medicine elected *Steven J. Davidson, M.D.,* president.

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